VISUAL ENVIRONMENTAL ADAPTATION PROBLEMS OF THE PARTIALLY SIGHTED:

Final Report

PREPARED FOR THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

S.M. GENENSKY, S.H. BERRY,
T.H. BIKSON, and T.K. BIKSON

CPS-100-HEW JANUARY 1979

CENTER FOR THE PARTIALLY SIGHTED

SANTA MONICA HOSPITAL MEDICAL CENTER

HV5653
G286

M.C. MIGEL MEMORIAL LIBRARY
American Foundation for the Blind
15 West 16th Street, New York, New York
10011

The work upon which this publication is based was performed pursuant to RSA Grant 14-P-57872/9 and RSA Grant 14-P-57997/9 with the Department of Health, Education, and Welfare. Views or conclusions contained in this study should not be interpreted as representing the official opinion or policy of the Department of Health, Education, and Welfare.

VISUAL ENVIRONMENTAL ADAPTATION PROBLEMS OF THE PARTIALLY SIGHTED:

Final Report

PREPARED FOR THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

S.M. GENENSKY, S.H. BERRY,
T.H. BIKSON, and T.K. BIKSON

CPS-100-HEW JANUARY 1979

CENTER FOR THE PARTIALLY SIGHTED

SANTA MONICA HOSPITAL MEDICAL CENTER

HV5653
G286
copy one

PREFACE

This report documents the results of a three-year study sponsored by the Rehabilitation Services Administration (RSA) of the U.S. Department of Health, Education, and Welfare (DHEW) entitled, "Some Important Visual Environmental Adaptation Problems of the Partially Sighted." The study was funded by RSA Grant 14-P-57872/9 to The Rand Corporation of Santa Monica, California, for the period July 1975-June 1976, and by RSA Grant 14-P-57997/9 to the Santa Monica Hospital Medical Center, also of Santa Monica, California, for the period July 1976-June 1978. Administration of the study was transferred from The Rand Corporation to the Santa Monica Hospital Medical Center at the end of June 1976, when the study director and his secretary moved from Rand to the Medical Center. The transfer had the full support and cooperation of RSA, Rand, and the Medical Center.

Chapter 1 of this report defines important terms, presents the aims of the study, discusses the partially sighted population, and describes the data-gathering procedures. Chapter 2 explains the objectives and methods of data collection and describes the makeup of the "sample" population. Chapter 3 explains a method of rating the severity of visual environmental adaptation problems (VEAPs) and applies it to the more than 150 potential VEAPs examined in this study. This is followed by an exhaustive examination of the inquiries that were made, by means of a questionnaire, concerning potential VEAPs. This in turn is followed by a presentation of questions that did not have enough respondents to warrant a detailed analysis, but that are thought to be of interest to partially sighted persons and those that serve them. Chapter 4 explores in detail data concerning visual aids, education, job satisfaction and vocational training, and interactions with organizations serving the visually impaired. Chapter 5 examines and analyzes psychosocial questions. Chapter 6 presents the conclusions of the study.

A 307-page supplementary volume to this report contains the complete questionnaire codebook and mobility rating form used in our study; it

comp. copy 5/30/79

is entitled "Visual Environmental Adaptation Problems of the Partially Sighted: Questionnaire Codebook and Mobility Rating Form (CPS-101-HEW)." Those persons who would find the supplementary information valuable may obtain a copy by writing to the Center for the Partially Sighted, Santa Monica Hospital Medical Center, 1225 Fifteenth Street, Santa Monica, California 90404.

SUMMARY

This study of visual environmental adaptation problems (VEAPs) of partially sighted people was conducted with three major purposes in mind: to collect a mass of detailed information on a sample of this population and the VEAPs they encounter (hence, the dozens of minutely detailed tables in this report); to study the ways in which particular people cope with their VEAPs so as to furnish useful suggestions for other partially sighted people; and, when the data should warrant, to make recommendations to the partially sighted, the health professions, training institutions, and government agencies.

We undertook the time-consuming and expensive task of collecting data directly from partially sighted people because no other data existed. Little systematic work in this area was available either as a data source or as a guide to data collection. For this reason we designed our procedures with the additional purpose of providing a critical guide for future data collection.

Our study was limited to adults of age 18 and over, with a special emphasis on adults of working age. We imposed no upper age limit, but eliminated anyone who was unable to complete the interview or to carry out the activities required for the mobility observation because of mental or physical handicaps other than vision. We also limited the study to persons who had been partially sighted for at least a year and who were at least six months away from their most recent eye surgery.

Some of our conclusions and recommendations must be regarded as tentative because our sample is small. We collected data from 94 partially sighted persons of both sexes through personal interviews, examinations by optometrists, and systematic observation of study participants' responses to actual environmental situations. The sample was designed to include as much variation as possible in current age, age since onset of visual problem, and type of injury or ocular disease. The results should therefore be viewed as a set of widely ranging case histories, rather than as a statistically representative sample.

The major overall conclusion we drew from our research is that partially sighted people could use their valuable residual vision to much greater advantage than they are currently using it. They could do so chiefly by using currently available visual aids more extensively, and by being trained in their use. These include such aids as telescopic and microscopic spectacles, binoculars, monoculars, passive infrared night-viewing devices, closed circuit TV systems, and interactive classroom television systems.

One of the reasons that many partially sighted people are not using such devices to their full advantage is sheer lack of information about these devices and their potentialities. In this case, the solution is simple: more effective dissemination of information. In other cases, solutions are more difficult because the problems stem from psychological and institutional causes. For example, some partially sighted persons, perhaps overly concerned with personal appearance, shy away from visual aids that they regard as unusually conspicuous--all the more so if their ophthalmologists or optometrists find such aids obtrusive and prescribe small or often underpowered and thus less effective aids. We believe that any visual aid that enhances life for its users should be considered without bias by prescribing clinicians.

Another barrier is the definition of "blindness" commonly accepted by the government, by society at large, by organizations that aid the legally blind, by educational institutions--and as a result, unfortunately, by many partially sighted persons; these definitions are typically too gross to be fully helpful, and lead to several distortions and injustices. Contrary to popular impression, most legally blind people are not functionally blind. Fully 75 percent of legally blind persons possess residual vision, but a disproportionate share of research funds and direct aid is devoted to the functionally blind. A curious cultural result of these phenomena is that many people who work with the partially sighted have a tendency to encourage them to accept the life-style of the functionally blind--hence a further reason for the neglect of visual aids. Numerous people in our study, however, have rebelled against being classified as "blind" and have insisted on

an equal footing in the sighted society, sometimes to the point of denying the seriousness of their impairment. Although we believe it would be salutary for them to confront their partial visual loss in order to cope effectively with the limitations of low vision, we must admire their spirit. A resignation to "blindness" implies the surrender of the valuable remaining powers of residual vision and the acceptance of a much more restricted life than is warranted.

Consequently, the study makes the following further recommendations and observations:

The federal government should formally recognize partially sighted people as a separate and distinct group from the functionally blind. If this were done, we believe that state, county, and local government agencies, as well as most private groups serving the visually impaired, would recognize the separate existence and distinct needs of these two very important visually impaired populations.

The study strongly argues for greater emphasis in schools and in vocational training programs on the use of residual vision.

Among those people who are below or above the age range served by various state departments of rehabilitation, there are many needy partially sighted persons who cannot obtain the visual aids they require to function effectively. In theory, Public Law 94-142 money should be available to purchase aids for partially sighted school children, but because such funds are very limited and because they are used for ameliorating all types of impairment in children, they cannot fulfill the visual aid needs of all or even a very significant portion of the country's partially sighted children. And even for aids covered by these funds, an alteration in policy would be needed before partially sighted children could take the aids home to help them cope with homework and with extracurricular needs.

Older persons constitute the other major group of the partially sighted who need visual aids and who have no third-party payment source if they or their families cannot afford to pay for them. With one exception, Medicare equates visual aids with ordinary eyeglasses and hence does not cover them. The exception is cataract spectacles worn

by persons who have had one or both lenses removed from their eyes. In this case, Medicare views the spectacles as a prosthetic device. We believe that other visual aids should also be regarded as prostheses; that list should include, for example, closed circuit TV systems, monoculars, binoculars, telescopic and microscopic spectacles, hand-held and stand magnifiers, and "unconventional spectacles." These visual aids could be made available at an annual cost that would be quite reasonable, compared with the cost of other medical services currently paid for by the federal government for most older adult citizens.

In addition, our data point to a particular subset of partially sighted people who are likely to be less active and to need special help besides visual aids: those who have recently become partially sighted and have very severe visual limitations--especially those who are older, female, and lower in education and income. For these groups, model programs aimed at increasing the scope of functional effectiveness might prove especially beneficial.

Finally, the study recommends that further research be conducted in such areas as: refinement of the measurement of functional residual vision; the relationship between visual field and acuity limitations and the activity types and levels of partially sighted people; the relationship between age and activity type levels; and the relationship between "blind orientation" in partially sighted people and their activity types and levels.

The study report is organized in the following way. A description of the purpose of the investigation and definitions of key terms in the research are provided in Chapter 1, prepared primarily by Genensky. Chapter 2 details the nature of the data collection procedures and the study sample; Berry assumed major responsibility for this chapter. An extensive account of the type and severity of VEAPs experienced by the study sample is presented in Chapter 3, along with information about associated visual and demographic factors and, when available, suggestions for their amelioration; this material was prepared primarily by Genensky. Chapter 4 (basically the work of Bikson and Bikson) reports the resources that the respondents made use of in coping with VEAPs,

including visual aids, educational and vocational training, and organizations for the severely visually impaired. Life-style and activity level across a range of everyday undertakings are explored in Chapter 5, for which Berry had primary responsibility. Study conclusions are discussed in Chapter 6, followed by three Appendixes that provide more detailed information about the non-self-report measures employed in the research. Chapter 6 was prepared by Bikson, Bikson, and Genensky, while Berry directed the development of the Appendixes. A supplementary volume, prepared by Berry and Genensky, contains the data collection instruments together with response codes and response frequencies; it is intended to serve as a reference manual for the report and a guide for future research.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the assistance of the numerous people and organizations who participated in many different ways in the preparation of this report and the research that led up to it. Our former Rand colleague Dr. Harold Petersen contributed significantly to the preparation of the project data-gathering instruments. Marilyn Fisher, Linda Lazo-Lane, and Linda Prusoff of Rand handled participant screening and scheduling, administered the project questionnaire, and supervised the mobility test with great patience and care. Judy Jamison, Patricio Velez, Mari Yokota, Ellyn Bloomfield, and the survey data staff of The Rand Corporation participated in the work on data reduction and data processing for analysis. Drs. Deborah Hensler and David Stewart of Rand showed deep interest in this project, and their efforts contributed greatly to its success. Drs. Carl Hensler of the University of California at Los Angeles and Daniel Relles of The Rand Corporation assisted with statistical advice and guidance.

Drs. Robert Gordon, Herbert Kadell, Hubert Moshin, and William Weiler carried out the visual examinations with precision and care, and Dr. Gordon and Dr. Theresa Porter contributed significantly to the analysis of visual data. In addition, many individuals and organizations assisted by providing names and phone numbers of potential participants. In this regard, Dr. Wayne Hoeft of the Southern California College of Optometry and Dr. Gordon were especially helpful.

We want to thank Kathleen Davidson for her assistance in preparing this manuscript; Alice Bloch and Will Harriss for their careful editing of this report; Jeffrey Catania and LaDonna Ringering for thorough checking of table data; Marion Genensky for taking charge of all the production editing activities that led to its publication; and Nan Best, Irene Ing, Edith Kuhner, Jean Spear, and Margaret Wray for their careful typing of the many drafts of the manuscript.

Finally, we especially thank and acknowledge the assistance of the participants in our study for their cooperation, patience, and enthusiasm. These men and women, who gave freely of their time and experience, are in large measure responsible for the project's success.

CONTENTS

PREFACE iii

SUMMARY v

ACKNOWLEDGEMENTS xi

TABLES xv

Chapter

1. INTRODUCTION 1

2. COLLECTION OF RESEARCH DATA AND DESCRIPTION OF PARTICIPANTS 6
   - Objectives of the Data Collection 6
   - Sample Design 7
   - Sample Selection Procedures 7
   - Locating and Contacting Respondents 10
   - Description of Data Collection 12
   - Staffing the Data Collection 13
   - Design of Forms and Data Processing 13
   - Description of Participants 17
   - Conclusions 25

3. ANALYSIS OF VEAPS AND POTENTIAL VEAPS 27
   - Introduction 27
   - Identifying VEAPs and Grading Them for Severity 27
     - Developing the Questionnaire 27
     - Analyzing the Responses 28
   - Probing the VEAPs 36
     - Mobility 37
     - Public Buildings 57
     - Money, Shopping, and Restaurants 63
     - Entertainment 75
     - Reading, Writing, Classrooms, and Libraries 82
     - On the Job 87
     - Recognizing Familiar Faces 92
     - Using the Telephone 94
     - Problems at Home 94
     - Accidents 113
     - Other Problems 114
   - Low-Frequency Problems of Serious Concern 115
     - Driving a Car 115
     - Child Care 117
   - Conclusions 118

4. SERVICES AND ASSISTANCE TO THE PARTIALLY SIGHTED 119
   - Section 1: Visual Aids 120
   - Section 2: Education 126

Section 3: Occupational Training 128
Section 4: Organizations for the Partially Sighted or the Functionally Blind 133
Conclusions 138

5. PARTICIPANT CHARACTERISTICS RELATED TO ACTIVITY LEVEL AND ORIENTATION TOWARD A BLIND LIFE-STYLE 140
Analysis of Activity Levels 140
Analysis of Blind Orientation 155
Conclusions 158
Areas for Future Research 159

6. CONCLUSIONS 161
The Modal Respondent 161
Using Residual Vision 162
Dealing with VEAPs 162
Visual Aids 168
Educational Training 169
Activity Patterns 171
Recommendations for Policy Change and Future Research 172

Appendix
A. AGREEMENT OF SELF-REPORTS AND OBSERVATIONS OF ABILITY TO COPE WITH VEAPS 175
B. AGREEMENT OF PARTICIPANTS' AND PHYSICIANS' DESCRIPTIONS OF VISUAL CONDITION 179
C. VISUAL CONDITION CODES 181
D. LIST OF AIDS FOR THE PARTIALLY SIGHTED 185

REFERENCES 187

BIBLIOGRAPHY 191

TABLES

2.1 Target and Actual Sample Sizes by Current Age, Age at Onset, and Sex 9
2.2 Target and Actual Sample Sizes by Main Visual Problem and Sex 10
2.3 Age of Participants by Sex 18
2.4 Years with Serious Visual Problem by Sex 19
2.5 Mean Years Partially Sighted, by Age Category and Sex 20
2.6 Seriousness of Visual Problem by Overall Reading and Mobility 21
2.7 Serious Overall Reading and Mobility Visual Problems as a Function of Age 23
2.8 Employment Status by Sex 24
2.9 Participants' Annual Household Income Category by Age of Participants 25

3.1 VEAP Rating System 29
3.2 Severe VEAPs 30
3.3 Moderate VEAPs 32
3.4 Minor VEAPs 34
3.5 Variables Affecting Visual Comfort Outdoors 38
3.6 Use of Aids Outdoors 39
3.7 Use of Visual Aids Outdoors for Specified Purposes 40
3.8 Potential Barriers to Outdoor Activity 40
3.9 Outdoor Illumination 42
3.10 Problems Encountered When Crossing a Street 42
3.11 Methods for Crossing Streets 43
3.12 Methods for Finding Addresses 44
3.13 Methods for Finding Stores 44
3.14 Bus Travel Alone 46
3.15 Methods for Finding Correct Bus 48
3.16 Methods for Paying Fares 48
3.17 Methods for Finding Empty Seat 49
3.18 Methods for Finding a Familiar Bus Stop 49
3.19 Methods for Finding an Unfamiliar Bus Stop 50
3.20 Problems Getting Off the Bus 50
3.21 Taxi Travel Alone 51
3.22 Problems with Taxis 51
3.23 Airplane Travel Alone 52
3.24 Activities in Airports and on Planes 53
3.25 Other Troubles with Planes and Airports 53
3.26 Ways In Which Airports Could Improve 54
3.27 Use of Hotels and Motels 55
3.28 Activities in Hotels and Motels 56
3.29 Other Problems with Hotels and Motels 56
3.30 Visiting Public Buildings 57
3.31 Problem Areas in Public or Office Buildings 58
3.32 Suggestions for Wall Directories and Room Numbers 58

3.33 Negotiating Stairs 59
3.34 Using Elevators 61
3.35 Escalator Problems 62
3.36 Public Restroom Use 64
3.37 Use of Money and Checks 66
3.38 Shopping in Department or Discount Stores 67
3.39 Shopping in Supermarkets or Grocery Stores 68
3.40 Going to Restaurants, Cafeterias, and Fast Food Places 71
3.41 Activities in a Restaurant 72
3.42 Problems in Restaurants 73
3.43 Problems in Cafeterias 75
3.44 Watching Television 76
3.45 Movies and Theater 78
3.46 Sports Events 79
3.47 Participation in Sports and Hobbies 80
3.48 Sports and Hobbies Practiced and Given Up 81
3.49 Reading and Writing 83
3.50 Reading Various Materials 84
3.51 Classroom Activities 85
3.52 Using Libraries 88
3.53 Special Items and Services at Libraries 89
3.54 Job Experiences 90
3.55 Recognizing Familiar Faces 93
3.56 Using the Telephone 95
3.57 Obstacles in the Home 96
3.58 Methods for Ensuring Safety at Home 97
3.59 Cleaning Activities 97
3.60 Methods for Judging Cleanliness of Objects 98
3.61 Cooking Activities 99
3.62 Preparing Food 100
3.63 Things Used in Cooking 100
3.64 Medicines and First Aid 102
3.65 Using Tools 104
3.66 Yardwork and Gardening 107
3.67 Gardening Problems 107
3.68 Additional Gardening Problems 107
3.69 Sewing 108
3.70 Matching Colors 110
3.71 Grooming 111
3.72 Accidents 113
3.73 Driving in Various Weather Conditions 116
3.74 Potential Driving Problems for a Partially Sighted Driver 116
3.75 Child Care Tasks 117

4.1 Use of Visual Aids 122
4.2 Education and Serious Visual Impairment 127
4.3 Employment Categories 130
4.4 Vocational and Practical Training 131

4.5 Vocational and Practical Training for the Fully Sighted, the Partially Sighted, and the Functionally Blind 132
4.6 Organizations for the Partially Sighted or the Functionally Blind Mentioned by Project Respondents 134
4.7 Judgment About Information or Service Received 137

5.1 Variables Included in Activity Scales 142
5.2 Regression of Vision, Demographic, and Visual Training Variables on Activity Scales 149
5.3 Correlations of Vision, Demographic, and Visual Training Variables with Activity Scales 152
5.4 Correlations Between Activity Scale Values 155
5.5 Variables Included in Blind Orientation Scale 156
5.6 Regression of Vision, Demographic, and Rehabilitation Training Variables on Blindness Orientation Scale 157

A.1 Matched Items from Questionnaire and Mobility Test 175
A.2 Accuracy of Reports of Ability to do Test Items 176
A.3 Accuracy of Participants' Reports of Ability to do Tasks 178

C.1 Reading/Close Work Codes 182
C.2 Mobility Codes 183
C.3 Correlations of Acuity, Visual Field, and Overall Ratings for Reading and Mobility 184

Chapter 1

INTRODUCTION

Visual environmental adaptation problems (VEAPs) of the partially sighted have been defined, for the purposes of this research, to include any problems this population may have in carrying out activities that have a large visual component and that are important to the educational, vocational, and social adaptation of these people to a fully sighted society.

In the course of previous research on aids for the partially sighted, it became more and more evident that these people are not functionally blind (Genensky, 1971; Genensky, 1978). Most partially sighted people have enough residual vision (in some cases enhanced by optical or electro-optical aids) to perform such activities as reading printed or handwritten material, writing with a pen or pencil, and moving safely and independently even in an unfamiliar environment. The partially sighted, then, are able to use their residual vision for a variety of activities in ways that are not possible for the functionally blind. Further, the visual aids that they use (for example, telescopic and microscopic spectacles, binoculars, monoculars, closed circuit TV systems, and light-amplifying devices) differ markedly from the aids used by the functionally blind (for example, canes, guide dogs, braille, and electro-optical to tactile devices such as the Optacon). The methods which these two groups may employ for coping with their VEAPs are not the same, nor is there any reason for them to be the same. Residual vision, like any other sensory capability, is a capacity that should be used as much as possible when it is available to promote effective coping with the environment.

Finding ways to assist the partially sighted to make better use of remaining eyesight was the long-term goal of the research reported here, which first sought to investigate the kinds of environmental difficulties encountered by that population. It was expected that environmental difficulties experienced by this group would differ

markedly from those experienced by the functionally blind as well as the fully sighted, and thus that they would constitute a group deserving special attention. For clarity, it is appropriate to begin by defining several terms that will be used throughout the report to refer to visual status.

Functionally blind: Persons will be said to be "functionally blind" if the vision in the better eye, even with the help of ordinary corrective lenses, is either altogether absent or consists at best of light perception or light projection.

Legally blind: Persons will be said to be "legally blind" if the vision in the better eye, even with the help of ordinary corrective lenses, is no better than 20/200 or if the maximum diameter of the visual field is no greater than 20 degrees.

Partially sighted: Persons will be said to be "partially sighted" if the vision in the better eye, even with the help of ordinary corrective lenses, is no better than 20/70 but is better than light perception or light projection, or if the maximum diameter of the visual field is no greater than 20 degrees.

Visually impaired: Persons will be said to be "visually impaired" if they are either functionally blind or partially sighted.

Fully sighted: Persons will be said to be "fully sighted" if they are not visually impaired.

Using these definitions, available data indicate that a substantial proportion of the visually impaired population is partially sighted. An examination of the Model Reporting Area (MRA) data published by the Public Health Service and the National Institutes of Health during the period 1962-1970 provides the basis for estimates about the current composition of the visually impaired population. As of 1977, partially sighted Americans numbered about 1.7 million, of whom 339 thousand were legally blind. Further, it was estimated that the partially sighted who were also legally blind made up more than 75 percent of the 450 thousand Americans who were legally blind. In other words, the vast majority of the legally blind are not functionally blind, but partially

sighted; by this we mean that they have remaining eyesight or residual vision that can and should be used to cope with their environment. In addition, over 93 percent of the visually impaired are partially sighted, and hence less than 7 percent are functionally blind.

Finally, there are persons and organizations within the blindness community who believe that, at least among the legally blind, most of those who do have residual vision (i.e., are partially sighted) will eventually become functionally blind; although precise studies are needed to estimate actual transition rates, existing MRA data overwhelmingly refute the inferred progression to total blindness. Instead, that evidence strongly indicates that there is only a very remote probability that a partially sighted person, selected at random from the entire partially sighted population, will eventually become functionally blind. This means that the vast majority of the partially sighted will not become functionally blind. These people will face the VEAPs that are common to the partially sighted and, unlike the functionally blind, they will potentially be able to handle many of those VEAPs <u>using their aided or unaided residual vision as well as their other sensory capabilities</u>.

In view of the circumstance that the partially sighted population forms a special and substantial subgroup of the visually impaired whose visual status is not likely to change, investigation of problems unique to this subgroup was undertaken. The specific objectives of the research reported here were:

- To determine large subset of the VEAPs of the partially sighted.
- To determine which of these VEAPs appear to be most important to the partially sighted.
- To determine which of these important VEAPs are currently (a) handled successfully and easily by the partially sighted, (b) coped with only with an excessive expenditure of time and effort, and (c) beyond their capability. (Because of the wide variability of the visual capability and coping capability of the partially sighted, it was anticipated

that the items falling into categories (a), (b), and (c) would vary for different individuals, and this was borne out by the study.)

- To determine what can be done, using existing techniques or aids, to help the partially sighted handle more efficiently some of the problems classified as demanding an excessive expenditure of time and effort.
- To suggest promising avenues of research and development leading toward new techniques or aids that might help the partially sighted cope with some of the more difficult VEAPs for which no combination of existing techniques or aids appears to offer a satisfactory solution, and to better handle some of those VEAPs that currently require an excessive expenditure of time and effort. (As used here, a technique is defined to be a procedure, not involving the development of new visual aids, that helps the partially sighted to cope with one or more of their VEAPs.)

We imposed two limitations on our research. First, considerable effort has already been expended in developing visual aids that help partially sighted persons to read, write, copy, and sketch, and a good deal of information has been gathered about the reading and writing problems of the partially sighted (Genensky et al., 1968; Genensky, 1968; Genensky, Moshin, and Steingold, 1969; Genensky, 1970; Clewett, Genensky, and Petersen, 1971; Genensky et al., 1972; Genensky, Moshin, and Petersen, 1973; Genensky, 1973; Genensky, 1974; Genensky et al., 1974; Genensky et al., 1975; Genensky et al., 1977; Bikson, Bikson, and Genensky, 1978; Goodlaw and Genensky, 1978; Bikson, Bikson, and Genensky, 1979). These problems were therefore not emphasized in the research presented here. Rather, problems related to work and to other instrumental living tasks were given more attention. Second, data gathering was limited to partially sighted persons who were at least 18 years old, since problems of younger people in adapting to the physical, intellectual, and social environment are typically mediated by

another person (a parent or legal guardian, the visual education teacher in the school, and so on). This exploration restricted its efforts to persons of working or retirement age who are typically responsible for their own environmental adaptation problems. Finally, while multiple handicaps are not uncommon, study participation was limited to persons for whom vision was the only or at least the dominant handicap.

Within these constraints, we believe that the research described in this report has fulfilled the first three of its five objectives, providing information that is meaningful and useful relative to our sample of partially sighted respondents, and very likely is applicable to a large fraction of the entire adult partially sighted population of the United States.

Although we also addressed the last two objectives in the study and tried to establish a better basis for understanding them, much more needs to be done before those two questions are answered adequately. We intend to examine those questions further and to incorporate such examination in one or more future studies.

Chapter 2

COLLECTION OF RESEARCH DATA AND DESCRIPTION OF PARTICIPANTS

Data were collected from 94 partially sighted persons using personal interviews, examinations by optometrists, and systematic observation of study participants' responses to actual environmental situations. The sample was designed to include as much variation as possible in current age, age since onset of visual problem, and type of injury or ocular disease. As such, it should be viewed as a set of widely ranging case histories, rather than as a statistically representative sample.

This section explains the objectives and methods of data collection and describes the final group of participants.

OBJECTIVES OF THE DATA COLLECTION

We undertook the time-consuming and expensive task of collecting data directly from partially sighted people because no other data existed. Little systematic work in this area was available either as a data source or as a guide to data collection. For this reason we designed our procedures with the additional purpose of providing a critical guide for future data collection.

Our most important research task was to determine what environmental conditions were the most serious barriers to participation in the sighted world by the partially sighted. We expected that barrier experiences and modes of dealing with them would vary across the group of participants, and that this variation might provide clues to helping others cope more effectively. Solutions found by some people, for instance, might be taught to others.

For such purposes we needed information about participants' experiences in a wide range of activities. To obtain it, we relied primarily on an interview that took about two hours to complete. In addition to data about everyday activities, we asked about participants' visual

condition and history, their education, jobs, families, and feelings about themselves and their world.

A mobility observation and a laboratory visual examination were used to expand and verify the interview. The laboratory examination, conducted with all participants, measured vision in detail and provided a description of visual aids used by participants. The mobility observation, conducted with about half of the participants, was designed to assess in a very general way the accuracy of self-reports (see Appendix A for a brief report of the results).

SAMPLE DESIGN

Our study was limited to adults aged 18 and over, with a special emphasis on adults of working age. We imposed no upper age limit, but eliminated anyone who was unable to complete the interview or to carry out the activities required for the mobility observation because of mental or physical handicaps other than vision. We also limited the study to persons who had been partially sighted for at least a year and who were at least six months away from their most recent eye surgery.

We believed that the most important factors in determining how much and how successfully a partially sighted person attempted to deal with the sighted world were age, sex, how long he or she had lived with a serious visual problem, and the nature of the ocular disease or injury. Accordingly, the sample was stratified by sex, current age, and age at onset of serious visual problem. Independently of these categories, the sample was stratified by type of ocular disease(s).

SAMPLE SELECTION PROCEDURES

Target quotas were established for each sex and age category (for example, males, between 18 and 39, who had become partially sighted before age 5) and also for each ocular disease (for example, glaucoma). For acceptance as a participant, a person had to fall into an open cell defined by sex, age, and age at onset, and into an open ocular disease category. These checks were independent of one another; that is, groups

defined by sex, age, and age at onset were not subdivided by ocular disease category. Thus some natural clustering occurred due to the age-specific nature of certain visual problems. Macular degeneration, for example, is most common after age 50, while at the time of the study for our participant population, retrolental fibroplasia (RLF) was almost unique to people aged 23 through 35. For a distribution of the target sample, see Tables 2.1 and 2.2.

The limits chosen for categorizing current age and age at onset were somewhat arbitrary. Current age is divided into three groups: 18-39, 40-59, and 60 and over, generally reflecting levels or types of activity through adulthood. The categories for age at onset were under 5, 5-18, 19-55, and over 55. These reflected preschool years, school years, active adulthood, and older years. The break point between adulthood and older years was chosen because some ocular diseases that are common later in life begin to appear in larger numbers around age 55.

The ocular disease categories were based on Model Reporting Area (MRA) listing of "affections" (Model Reporting Area for Blindness Statistics, 1962-1970), with some alterations (described below) based on our own interests. Our glaucoma category, unlike that of the MRA, includes congenital glaucoma as well as glaucoma of later origin. The three MRA ocular disease categories with the smallest incidence--keratitis, other affections of the cornea or sclera, and "unknown"--were placed in our "other" category. On the other hand, although retrolental fibroplasia has low incidence according to the MRA data, it was included as a major category because of its current prevalence among visually impaired young adults. Participants were classified for sample allocation purposes on the basis of both their ophthalmologists' and their own descriptions of their visual impairments (see Appendix B).

The actual number of participants in each cell sometimes differs from the target number. This is due to the difficulty of finding suitable participants within project time and cost constraints. As the study neared completion, projected numbers of subjects for certain

Table 2.1

TARGET AND ACTUAL SAMPLE SIZES BY CURRENT AGE, AGE AT ONSET, AND SEX

Current Age	Age at Onset	Target for Each Sex	Actual Sample		Total Sample	
			Male	Female	Target	Actual
18-39	Under 5	7	9	11	14	20
	5-18	7	4	2	14	6
	19-55	3	5	3	6	8
	Over 55	--	--	--	--	--
	Not classified	--	1	1	--	2
	Total, 18-39	17	19	17	34	36
40-59	Under 5	6	6	2	12	8
	5-18	5	1	5	10	6
	19-55	5	11	6	10	17
	Over 55	2	0	1	4	1
	Not classified	--	--	1	--	1
	Total, 40-59	18	18	15	36	33
60 and over	Under 5	2	1	1	4	2
	5-18	3	1	1	6	2
	19-55	4	2	3	8	5
	Over 55	6	8	7	12	15
	Not classified	--	--	1	--	1
	Total, over 60	15	12	13	30	25
Total, all ages		50	49	45	100	94
Totals by age of onset:						
	Under 5				30	30
	5-18				30	14
	19-55				24	30
	Over 55				16	16
	Not classified				--	4

Table 2.2

TARGET AND ACTUAL SAMPLE SIZES BY
MAIN VISUAL PROBLEM AND SEX

Main Visual Problem	Target for Each Sex	By Sex: Actual Sample Male	By Sex: Actual Sample Female	Total Sample Target	Total Sample Actual
Cataracts	6	6	3	12	9
Glaucoma	3	4	1	6	5
Retinal degeneration	13	11	18	26	29
Other retinal	8	7	2	16	9
Optic nerve degeneration	3	3	1	6	4
Retrolental fibroplasia	2	1	3	4	4
Myopia	1	0	0	2	0
Uveitis	1	0	2	2	2
Combination	7	6	7	14	13
Other	7	11	8	14	19
Total	51	49	45	102	94

ocular disease categories were exceeded to allow completion of difficult-to-fill demographic cells, and vice versa. The attained sample can be seen in Tables 2.1 and 2.2.

LOCATING AND CONTACTING RESPONDENTS

We recruited potential respondents in two ways. We contacted partially sighted people recommended to us by optometrists in low vision practice, ophthalmologists and other physicians, the California State Department of Rehabilitation, and other persons and agencies. We also circulated notices about the study in places where partially sighted persons or their families would be likely to see them. These notices briefly explained the study and asked interested people to call us.

Our initial contact with a potential participant was usually by telephone. During the first contact we explained the purpose of the study, told the person how much time and effort were required for

participation, and collected information needed to determine whether the person fit into an open sample category. If the person did, we arranged a first appointment and sent him or her a brochure about the study (prospects were offered the choice of receiving a large-type or regular-type version). For those persons who did not fit into an open category we thanked them, explained that we could not ask them to participate at that time, and asked if we might keep their names in case we needed to call in the future.

We collected 286 names, half of which were given to us by ophthalmologists and other physicians, and optometrists in low vision practice. Another 27 percent were given to us by public and private agencies, 16 percent were suggested by other participants, and 7 percent volunteered in response to our advertising. In some cases we started with only a name and address; in others we had additional information that allowed us to decide whether the person fit our sample or not. We screened 151 persons by telephone to obtain additional information from them. The final disposition of the 286 names was:

	Number of Names
Not asked to participate (175)	
Appropriate sample cell already full	91
Ineligible due to health, age, distance, etc. ..	64
Could not be reached for screening	20
Asked to participate (111)	
Completed all forms	94
Refused to participate	11
Incomplete	6

While we had difficulty filling some of our sample cells, we had almost no difficulty locating willing participants. Most of the people we talked with during screening were interested in participating. Those who refused usually did so out of concern that they would not be able to do what they thought we required of them rather than because of negative attitudes toward the study itself.

DESCRIPTION OF DATA COLLECTION

For this study, all data collection was designed and managed by The Rand Corporation. This section reviews that process and describes each component.

Each subject took part in the interview and underwent a visual examination. Half of the subjects also completed a full mobility test or examination; the rest completed an abbreviated version. Data were collected from each subject individually. The interview was completed first so that responses would be biased as little as possible by participants' perceptions of the views of the study staff or the results of visual and mobility examinations. The interview was conducted at whatever location was most convenient for the participant, although participants were encouraged to come into a study site whenever possible. Most interviews were completed in one session, but were broken into two or more sessions if the participant became fatigued. Whenever possible the interview was conducted privately, although family members were occasionally present.

As part of the interview, participants were asked to sign permission forms allowing their personal ophthalmologist to give information from their medical records. A special request form was sent to each ophthalmologist, and follow-up requests were sent when necessary. A total of 84 completed forms were returned. In a few cases, the study provided funds for an ophthalmological examination by a physician chosen by the participant.

Mobility examinations were carried out on a special course in the neighborhood of The Rand Corporation, including the Rand building and grounds as well as a nearby park and street. Each mobility examination was conducted by an interviewer, but an assistant accompanied the participant to prevent injuries. The visual examination was conducted in a laboratory at one of the study locations. An optometrist conducted the examination while an interviewer recorded the results. The visual examination was often completed in two or more sessions to prevent participant fatigue. Family members or friends who accompanied the participant were welcomed as observers.

Most participants arranged their own transportation to the study location. When necessary, however, a member of the project staff provided transportation. Data collection for the one interview and two laboratory examinations required a minimum of two sessions, and often required three or more. This made the job of scheduling appointments, which was handled by one of the interviewers, a very important one.

STAFFING THE DATA COLLECTION

Two interviewers completed most of the interviews, with a third interviewer and the survey designer conducting a few. The interviewers were Rand employees with previous survey experience but little interviewing experience. They were trained by the survey designer, who supervised the data collection. These interviewers also conducted the mobility examinations. Four optometrists performed the laboratory examinations, working with the interviewers, who recorded the results. Usually, the same interviewer worked with a participant throughout the data collection procedures. At minimum, however, the same interviewer completed the interview, regardless of how many sessions were required.

DESIGN OF FORMS AND DATA PROCESSING

All forms were developed by the study director, study staff members, and the survey designer. Optometrists involved in the study also worked on the laboratory and mobility examination reports. Outlines for data requirements were developed by the study staff. Actual questions were written by the survey designer. Each form went through several iterations as data requirements were refined and the question order and wording were polished.

The questionnaire, laboratory examination, and mobility test were pretested on six partially sighted people known to the study staff. Since these people were also knowledgeable about the visually impaired, they were asked to comment on the forms. The forms were then subjected

to major revision before being finalized. Throughout the study, however, minor changes and clarifications were made in the form of written "policy decisions," which were distributed to everyone on the staff.

The content, format, and processing of the three major data collection forms are described briefly below.

Questionnaire

The questionnaire contained 491 questions, including both closed- and open-ended items, which were read verbatim by the interviewers. Not all questions were applicable to all respondents, of course. Each questionnaire took two to three hours to administer. Responses to closed-ended items were recorded on the interview form for direct keypunching. Responses to open-ended items were recorded verbatim on the interview form for later coding; in addition, a tape recorder was used to back up verbatim recording.

Each interviewer edited her own questionnaires for completeness, using taped information when necessary. One interviewer coded all the visual aids each respondent used. Open-ended items were coded by a special group of coders, using codes developed from 25 randomly selected cases by the study staff.

After keypunching, the data were cleaned by checking range errors and logical inconsistencies. As errors were resolved, the data were corrected and a record kept of the reason for each change.

The interviews contained a description of participants and their visual problems, the kinds of visual aids the participants used, their educational and work history, organizations they had contacted for help with their impaired vision, and a history of their vision-related training. Interviews then explored a detailed list of potential visual adaptation problems in reading and writing; walking around; using transportation; going to public buildings, restaurants, theaters, and stores; doing household tasks; handling personal care and grooming; and coping with social situations. In these sections the emphasis was on whether potential barriers were perceived as presenting real visual

environmental adaptation problems for participants. If they were VEAPs, the interviewer sought to find out why they were, and if they were not, how participants coped with them. The interviewer also asked how participants felt about themselves and how their visual problems had affected them.

Most respondents found the questionnaire long but interesting, and were able to describe their problems and solutions to them in detail. Some found it difficult to discuss their frustrations and were occasionally sad or angry, but nevertheless seemed to welcome the chance to talk to an interested listener about an important part of their lives.

Mobility Rating Form

The mobility rating form, filled out by an interviewer observing the participant during mobility-related tasks, described 19 task areas. Instructions for doing each task were read to the participant. The method chosen to accomplish the task (e.g., vision or touch) and the result were recorded for each participant. In addition, the interviewer recorded which visual aids, if any, the participant used for each task. After filling out the form, the interviewer checked it for completeness. Visual aids were coded on the form and data were punched directly from it.

The tasks began with simple indoor exercises such as locating objects in a room, watching television, using the telephone, finding the kitchen, and pouring a glass of water. If these tasks were completed without difficulty, the participant was asked to operate an elevator and describe steps and obstacles at an entryway to the Rand building. If the interviewer believed that it was safe to proceed further, the participant was asked to locate parked and moving cars, follow walkways, read street signs, observe and interpret traffic signals and crossing signs, cross a street, and locate a public telephone. If participants had difficulty at any point, if the interviewer sensed uneasiness, or if the participant felt uncomfortable, the

mobility test was terminated. At the end of the mobility examination, the interviewer recorded environmental conditions (e.g., presence or absence of glare) that might have affected the results. She also rated the overall confidence and ability of the participant and noted any other nonvisual disabilities that might have affected the test results. Each mobility examination took about an hour.

Laboratory Examination Report

The laboratory examination report consisted of ten different forms, with multiple copies of each bound together into a separate booklet for each respondent. It was filled out during the examination session, and checked for completeness after the session. The data were keypunched directly from the form.

The laboratory examination began with simple observations about the participants' eyes and their vision. Then all the participants' visual aids, which were brought to the examination, were examined and described. Four basic kinds of forms for describing visual aids were provided, with either five or ten copies of each so that each visual aid could be described on a separate form. The examiner then checked color discrimination, distant visual acuity, near visual acuity (using both alphanumeric symbols and printed text), and the participants' visual fields. Multiple copies of forms for recording visual acuity measurements were provided so that visual acuity measures could be recorded for the unaided eye as well as with different aids. (If the participant used a CCTV system, a record was kept on how well the participant functioned with the project's CCTV system while, if necessary, using his or her own visual aid(s) to see the monitor screen clearly.) Each laboratory examination took from one to three hours and was carried out in several sessions when necessary.

As a final step, the visual acuity and visual field results of the laboratory examinations were summarized into levels of disability based on a coding scheme devised by optometrists and the study staff. The coding scheme set forth five levels of disability for acuity and

for field measurements relative to mobility problems and five levels of disability for acuity and for field measurements relative to problems involving close work. This distinction was made because mobility problems and problems involving close work make distinctly different demands on vision (see Appendix C). Acuity and field codes were further summarized into overall disability codes for mobility and for close work. Coding was carried out on the basis of laboratory examination reports by an optometrist who had not collected the original data. These codes can be regarded as alternative measures of visual function based on clinical experience. Subsequent references to these codes will be indicated as follows. "Acuity_r" and "acuity_m" will signify acuity levels associated with reading (i.e. close work) and with mobility, respectively. (These will also be referred to as reading acuity and mobility acuity.) "Field_r" and "field_m" will signify field levels associated with reading (i.e. close work) and with mobility, respectively. (These will also be referred to as reading field and mobility field.)

While other forms were used (interviewer reports, telephone screening forms, and the like), the interview, mobility results, and laboratory examination report provided the data base for investigating VEAPs among the 94 participants.

DESCRIPTION OF PARTICIPANTS

In the rest of this report we will be discussing the results of our data collection from 94 participants. It is important to remember that any conclusions drawn from these data cannot be generalized, in the statistical sense, to all partially sighted people. (Representative data about visual function and related activities among the partially sighted are nonexistent.) While the conclusions drawn may be valid only for our group of participants, it is possible that they may be valid for a larger portion of the partially sighted population. Our group of 94 participants is described in detail here so that readers can keep in mind the characteristics of the participants as they read subsequent sections of the report.

Background Characteristics

The participant group is almost evenly divided between men (n = 49) and women (n = 45). About a third of the participants were aged 21 through 35, 22 percent were 36 through 50, 26 percent were 51 through 65, and 19 percent were over 65 (see Table 2.3). While the distribution of ages for each sex differs--many more females than males fall in the 51-65 category--the mean age of males is 47.2 years, that of females is 47.7 years, and that of the combined groups is 47.4 years. Although the target population allowed for persons as young as 18, the youngest participant was 21. Of the participants, 82 were white, 8 were black, 2 were of another race, and 2 were not ethnically classified.

Table 2.3

AGE OF PARTICIPANTS BY SEX

(In percent)

Age Group	Male	Female	Total Sample
21-35	33	33	33
36-50	29	16	22
51-65	14	38	26
Over 65	25	13	19

Visual History

The participants had been partially sighted from 1 to 67 years; the mean was 21 years. There was little difference between males and females in age at onset; the mean for males was age 20.4 and for females, 21.9. The distribution also showed only small differences between males and females in the number of years they have been partially sighted (see Table 2.4). About 20 percent of the persons had been partially sighted for less than five years.

About a third had experienced severe visual problems for 5 to 20 years, and another third for 21 to 40 years; 14 percent had been partially sighted for over 40 years. While analysis of cases in finer intervals for more recently partially sighted people might provide more information about adjustment to visual loss, the small number of cases in this category rendered such procedures infeasible.

Table 2.4

YEARS WITH SERIOUS VISUAL PROBLEM BY SEX
(In percent)

Years with Serious Visual Problem	Male	Female	Total Sample
Less than 5	25	17	21
5-20	31	33	32
21-40	29	36	32
More than 40	15	14	14

In this sample, most of the younger participants (aged 21-35) had become partially sighted at a very young age, and most of the age 36-50 group had also been partially sighted for a large portion of their lives. In the older group a much larger percentage of participants had been partially sighted for a short time. In the 51-65 group, nearly half had been partially sighted for less than 20 years and over a quarter for less than 5 years. In the over-65 group, nearly all had been partially sighted for less than 20 years and nearly half for less than 5 years. The distributions were similar for males and females. This is shown in Table 2.5, which provides mean number of years partially sighted by category for males, females, and the total sample.

Table 2.5

MEAN YEARS PARTIALLY SIGHTED, BY
AGE CATEGORY AND SEX

	Age Category							
	21-35		36-50		51-65		Over 65	
Sex	Cell Mean	Sample Size	Cell Mean	Sample Size	Cell Mean	Sample Size	Cell Mean	Sample Size
Male	19	15	23	14	29	7	17	12
Female	24	14	29	7	23	15	9	6
Total sample	21	29	25	21	25	22	14	18

Visual Problems

For stratification purposes, the types of ocular diseases our participants had were described as noted above (see Table 2.2) for the sample as a whole and for males and females. Analyses of data regarding the obtained sample yielded the following additional information.

A few ocular diseases are associated with age. While only 45 percent of our subjects were aged 50 or over, 60 percent of the glaucoma and retinal degeneration patients in the sample are over 50. On the other hand, cataracts, optic nerve degeneration, and RLF are found almost exclusively in the under-50 groups. Participants in the "other retinal," "other," and "combination" categories are distributed approximately evenly across age groups.

Seriousness of Visual Problems

Table 2.6 shows the distribution of seriousness of visual problem ratings for the total sample, combining reading fields with reading acuities and mobility fields with mobility acuities (see Appendix C for an explanation of these codes). Most people fell into the least serious categories; only 28 percent had a very or extremely serious

Table 2.6

SERIOUSNESS OF VISUAL PROBLEM
BY OVERALL READING AND MOBILITY

	Percent of Sample	
	Overall Reading	Overall Mobility
Extremely serious	16	6
Very serious	12	11
Moderately serious	12	22
Some problem	35	31
Minor problem	17	27
Missing	8	3

rating for reading, and 17 percent had a very or extremely serious rating for mobility. The rank order correlation between these overall ratings is .66, indicating that the seriousness of reading problems for participants was significantly associated with the seriousness of their mobility problems. Only 6 percent of the cases were rated very or extremely serious in terms of both reading and mobility problems.

Some ocular disease conditions were associated with more serious visual problems than others. Although only 28 percent of the cases for which we had ratings received overall reading ratings in the very or extremely serious categories, 58 percent of retinal degeneration cases fell into these categories. By contrast, cataract, optic nerve

degeneration, RLF, and "combination" cases fell almost exclusively into the least serious reading categories.

Ratings for seriousness of mobility problems were generally lower than seriousness ratings for reading problems; only 17 percent of rated cases had very or extremely serious ratings. Three categories of condition--retinal degeneration, RLF, and uveitis--had higher percentages of serious cases, but the disproportionate occurrence approaches statistical significance only in the case of retinal degeneration, due to small sample sizes. Cataract, "other retinal," optic nerve degeneration, and "combination" cases fell almost exclusively into the least serious categories.

Due mainly to the prevalence of macular degeneration among the participants aged 50 or over and its relative seriousness in terms of visual impairment, we find that older people in general are significantly overrepresented in the more serious visual problem categories. Table 2.7 shows the percentage of participants in each age category whose visual condition was coded as very or extremely serious. About half the participants aged 50 or over had very or extremely serious overall reading problems, as compared with less than a quarter of the participants under age 50. The same pattern emerges for overall mobility problems (Table 2.7). It should be noted that a larger percentage of female than male respondents are over age 50 (51 versus 39 percent, respectively); nevertheless, the relationship between age and sex of respondents in the sample did not generate a significant association between sex and seriousness of visual impairment. These results should be used to help interpret subsequent analyses involving demographic and/or visual impairment variables.

Table 2.7

SERIOUS OVERALL READING AND
MOBILITY VISUAL PROBLEMS AS A FUNCTION OF AGE

	Coded as Very or Extremely Serious	
Age	Overall Reading	Overall Mobility
21-35	7	7
36-50	26	16
51-65	48	42
Over 65	53	5

Family Vision History

About 16 percent of participants reported other family members who were blind and 35 percent reported other partially sighted family members.

Legal Blindness

Overall, 81 percent of the participants are considered legally blind. Of the 18 who are not, 16 have never tried to be so classified. Since only four of these are considered to have very or extremely serious problems for reading or mobility, perhaps they believed they would not qualify. However, most participants in the least serious reading (56 percent) and mobility (68 percent) categories are considered legally blind, so this is probably not an accurate perception.

Education

The participants in our sample are very well educated: 17 percent have had some graduate education, another 19 percent have bachelor's degrees, and 25 percent have high school diplomas. The mean years of education is 14.5 for males and 13.3 for females.

Employment

Just under half of the participants were working part or full time. Of these, three-fourths were full-time employees. Twice as many males as females were employed full time, while three times as many females as males considered themselves unemployed. Approximately equal numbers of males and females, about 12 percent, had never worked at all (see Table 2.8).

Table 2.8

EMPLOYMENT STATUS BY SEX

(In percent)

Employment Status	Male	Female	Total Sample
Full time	45	22	34
Part time	10	11	11
Unemployed	8	29	18
Retired	20	11	16
Disabled	6	13	10
Never worked	10	13	12

Income

A majority of the participants (56 percent) reported annual family incomes of less than $10,000; 28 percent had incomes between $10,000 and $20,000; and 17 percent had incomes over $20,000. The distributions were nearly the same for males and females. As shown in Table 2.9, the youngest and oldest participants were least wealthy. About 90 percent

of the youngest and oldest participants' incomes fell into the under $10,000 and $10,000 to $20,000 categories, while about a quarter of the participants aged 36 to 65 had incomes of over $20,000. The sample thus includes primarily those with low to moderate incomes.

Table 2.9

PARTICIPANTS' ANNUAL HOUSEHOLD INCOME CATEGORY
BY AGE OF PARTICIPANTS

(In percent)

	Age of Participant				
Income	21-35	36-50	51-65	Over 65	Total
Under $10,000	55	62	48	59	56
$10,000-$20,000	38	14	26	29	28
Over $20,000	7	24	26	12	17

Household Size

About one-fifth of the participants lived alone, 45 percent lived with one other person, and 34 percent lived in households of three or more people. The distribution was nearly the same for males and females. Participants under age 50 were usually in one- or two-person households.

CONCLUSIONS

Our sample is well distributed over age and sex categories. Most participants have been partially sighted for more than five years, many for all or most of their lives. Older participants had become partially sighted most recently and had more serious visual impairments.

A minority of the participants had a family history of visual problems. Overall, few respondents had very severe visual limitations, although reading limitations were generally more serious than mobility limitations. Most participants were considered legally blind. They were well educated and nearly all had worked at some time, although 55 percent were not employed at the time of the study. A majority lived in households with annual incomes under $10,000.

Chapter 3

ANALYSIS OF VEAPS AND POTENTIAL VEAPS

INTRODUCTION

This chapter describes the visual environmental adaptation problems (VEAPs) revealed in the responses to our interview questions. As defined earlier, VEAPs include any problems the partially sighted may have in carrying out activities that have a large visual component and that are important to the educational, vocational, and social adaptation of these people to a fully sighted society.

Our discussion here is organized in the following way. First, we explain our approach for determining actual VEAPs and grading their severity. The interview questionnaire lists a large number of potential VEAPs and asks respondents to what extent each potential VEAP is an actual problem in their lives; in addition, open-ended questions enabled respondents to mention any VEAPs we might have neglected or omitted. We classify these VEAPs by severity, grouping all VEAPs found in the interview responses. The bulk of the chapter is then devoted to a more detailed probing of the VEAPs, using responses to both closed- and open-ended questions.

IDENTIFYING VEAPS AND GRADING THEM FOR SEVERITY

Developing the Questionnaire

As pointed out in Chapter 2, project staff members made a preliminary list of potential VEAPs in a series of meetings. We tried to include not only activities that transcend age and sex (e.g., reading, writing, and walking outdoors), but also activities that might be age- or sex-dependent (e.g., applying makeup, participating in sports, obtaining an education, and functioning on the job). We then refined this list of topics and questions to make up an initial version of the project questionnaire; the only items rejected at this

stage were those that Dr. Genensky believed might prove embarrassing to respondents.

The initial questionnaire was administered to six partially sighted persons who were recognized as knowledgeable about the problems of the partially sighted and functionally blind. The suggestions and criticisms of these persons, coupled with those of our colleagues at The Rand Corporation, helped us to revise the original questionnaire and to produce the final version, which we then administered to the 94 partially sighted persons who made up our respondent population.

Analyzing the Responses

We examined the questionnaire and isolated the items that probe potential VEAPs; only these items were included in this analysis. If fewer than 20 respondents answered a question, it was dropped from analysis; however, certain of these questions seemed particularly important and interesting in spite of their low response rate, and are therefore discussed later in this chapter.

To determine the severity of each VEAP, we applied a rating system to the responses for each appropriate question (Table 3.1). However, some questions gave the respondent a yes-no choice, while others gave three choices (yes-sometimes-no, or big problem-small problem-almost no problem). In our initial analysis, we considered as VEAPs only those potential problems that were answered "yes" or "big problem"; the VEAP level was determined by first computing the percentage of "yes" (or "big problem") answers, and then applying our rating system. (In some cases--e.g., "Can you usually see traffic islands?"--a "no" response indicated that "yes, this area is a problem for me"; responses to such questions were reversed for correct meaning before analysis was performed.)

Table 3.1

VEAP RATING SYSTEM

Percent of Responses Indicating a VEAP	Symbol	VEAP Level
0-10	A	No VEAP or very small
11-25	B	Small VEAP
26-50	C	Moderate VEAP
51-75	D	Severe VEAP
76-100	E	Very severe VEAP

Because this first analysis ignored responses indicating that a potential problem "sometimes" caused the respondent difficulty, or that a potential problem was "small" (but nonetheless a problem), we decided to perform a second analysis to discern areas that were at least sometimes problematic. Thus, we computed the combined percentage of "yes" and "sometimes" answers, and once again applied our rating system. (As before, we reversed "no" answers to "yes" where appropriate, and we considered "big problem" to mean "yes" and "small problem" to mean "sometimes.")

Table 3.2 lists the VEAPs that appear to be most severe (i.e., most frequent) for our subject population, in terms of both analyses (the "yes" analysis and the "sometimes" analysis). Table 3.3 shows VEAPs of moderate severity, and Table 3.4 lists VEAPs of least severity. (The VEAPs listed in these tables are discussed in more detail in the next section of this chapter.) While the VEAPs shown in Table 3.4 do not appear to represent significant problems for our respondents, we include them here because we believe it important to record the things that partially sighted persons can do with little or no trouble (as well as the things that they cannot do or that they can do only with difficulty). A careful examination of this list reveals that our respondents are able to use their residual vision to accomplish a large number of important and useful tasks that have a

Table 3.2

SEVERE VEAPS

E-level (very severe) problems in both "yes" and "sometimes" analyses:

Walking around alone in an unfamiliar area
Reading signs at bus stops
Determining the number or name of an approaching bus
Locating an unfamiliar stop while riding on a bus

D-level (severe) problems in "yes" analysis, E-level problems in "sometimes" analysis:

Going from bright daylight into a dark room
Finding the correct office on a wall directory in an office building
Seeing written material on a chalkboard or other distant display surface used for class discussions or question-and-answer periods
Finding out what things cost in a cafeteria
Recognizing a familiar face across the street

D-level problems in both "yes" and "sometimes" analyses:

Walking alone at night on a dimly lit street or in moonlight
Walking alone at night when it is very dark
Determining whether the right floor has been reached when alone on an elevator
Finding a public restroom
Telling a women's restroom from a men's restroom
Seeing details when viewing the stage in a theater
Seeing details when viewing a sports event
Copying material from a chalkboard
Following the host or hostess to a table in a restaurant
Reading the check in a restaurant when in the company of another person
Reading the menu in a restaurant when in the company of another person
Reading the menu posted on the wall in a fast food place
Reading labels on boxes or bottles of medicine
Reading a clinical thermometer
Threading a needle

C-level (moderate) problems in the "yes" analysis, E-level problems in "sometimes" analysis:

Going down curbs in daylight
Reading a phone book in a phone booth
Telling what foods are on display in a cafeteria

(continued on next page)

Table 3.2--Continued

SEVERE VEAPS

C-level problems in "yes" analysis, D-level problems in "sometimes" analysis:

Seeing skates, skateboards, and other small things left in the path of travel in daylight
Seeing wires or branches at head level in daylight
Seeing wires or branches at foot level in daylight
Seeing sprinklers mounted in the ground in daylight
Noticing stairs going down in daylight or in good lighting indoors
Finding the first step and walking down a flight of stairs in daylight or in good lighting indoors
Negotiating an occasional step that goes down in the home, yard, or patio in daylight or in good lighting indoors
Seeing sliding glass doors
Seeing partly open cabinet doors or drawers at head, waist, or leg level
Seeing small objects left on the floor
Walking alone at night on a brightly lit street
Going from a dark room into bright daylight
Finding a lobby wall directory in an unfamiliar building
Finding the correct office in an unfamiliar building
Reading the menu when alone in a restaurant
Reading the check when alone in a restaurant
Determining the gate number and departure time from a display board by oneself in an airport
Finding an assigned seat on an airplane by oneself
Recognizing a familiar face across a room
Reading TV Guide or the TV schedule in a newspaper, with any visual aids that the respondent uses

C-level problems in both "yes" and "sometimes" analyses:

Getting to or from an airport building by car, taxi, or bus by oneself
Finding an empty seat on a bus
Finding a familiar stop when riding on a bus
Finding an empty table in a cafeteria
Negotiating an occasional step that goes up in the home, yard, or patio in daylight or in good lighting indoors
Seeing furniture that has been moved to a new location in one's home or in someone else's home
Coping with floor buttons in an elevator
Using the card catalog in a library
Taking notes or writing call numbers from a library card catalog
Seeing details when watching television
Seeing details when watching a movie
Getting a seam or hem straight when sewing by hand
Seeing a nail as it is hammered into place
Seeing a screw as it is turned into place
Seeing a saw as it cuts material
Restricting the use of cosmetics because of vision

Table 3.3

MODERATE VEAPS

B-level (small) problems in "yes" analysis, D-level problems in "sometimes" analysis:

Finding the baggage claim area in an airport
Seeing bicycles and their riders in daylight
Avoiding branches and wires at waist level in daylight
Seeing a policeman's arms directing traffic with any visual aid the respondent uses
Trimming bushes and hedges
Reading recipes from cookbooks
Reading recipes from magazines and newspapers
Reading handwriting with any visual aid the respondent uses

B-level problems in "yes" analysis, C-level problems in "sometimes" analysis:

Seeing screen doors
Seeing room doors left ajar in a house
Seeing open doors and windows on hinges that swing open into one's path of travel in daylight
Seeing trash cans, crates, and boxes in one's path of travel in daylight
Seeing other pedestrians in one's path of travel in daylight
Seeing bicycles left in one's path of travel in daylight
Walking alone at twilight
Walking toward headlights at night
Walking on wet surfaces at night
Seeing a manhole with any visual aids the respondent uses
Finding a bus stop
Finding stores like restaurants, drugstores, and drycleaners on a strange street with any aids the respondent uses
Finding the entrance to an unfamiliar building
Finding the lobby receptionist in an unfamiliar building
Finding an elevator or stairway in an unfamiliar building
Finding departure and arrival gates at an airport
Locating one's own baggage at an airport
Changing airplanes when required
Finding one's way to the correct food counter in a cafeteria
Finding forks, spoons, mustard, catsup, etc., in a cafeteria
Finding an empty seat at a table that is partially occupied in a cafeteria
Finding where to put the tray after eating in a cafeteria
Seeing to operate laundry machine controls
Seeing what is written on the chalkboard in a classroom from any place in the room, with any visual aids the respondent uses
Reading a dictionary with any visual aids the respondent uses
Seeing one's own handwriting while one is writing
Knowing when things are done when cooking
Knowing when food is discolored
Knowing when food is spoiled

(continued on next page)

Table 3.3--Continued

MODERATE VEAPS

B- and C-level problems--continued

Giving first aid to oneself
Weeding in the garden
Matching colors and deciding which colors go together
Recognizing a familiar face across a table

A-level problem (none to very small) in "yes" analysis, D-level problem in "sometimes" analysis:

Seeing measuring lines printed on a measuring cup

A-level problems in "yes" analysis, C-level problems in "sometimes" analysis:

Seeing low hedges and bushes in or adjacent to the path of travel in daylight
Going up curbs in daylight
Following verbal directions accompanied by pointing
Locating the ticket counter in an airport
Determining whether an airplane restroom is occupied
Putting things on one's tray in a cafeteria
Edging a lawn
Setting the temperature dial on a stove
Pouring liquids when cooking
Turning things over in a pan when cooking

Table 3.4

MINOR VEAPS

B-level problems in both "yes" and "sometimes" analyses:

Walking on wet surfaces in daytime
Getting off a bus
Getting on or off an escalator
Reading a phone book with any visual aids respondent uses
Reading ordinary newspaper type with any visual aids respondent uses
Taking care of one's hair
Adjusting the heat on stove burners
Determining that a stove burner is on

A-level problems in "yes" analysis, B-level problems in "sometimes" analysis:

Seeing trees, parking meters, poles, stop signs, hydrants, and parked cars in or near one's path of travel in daylight
Walking in bright sunlight
Seeing a traffic island and crosswalk lines when walking, with any visual aids the respondent uses
Noticing stairs that go up
Finding the first step and walking up a flight of stairs
Checking in baggage at an airport
Finding a restroom on an airplane
Finding the coin slot and coin return in a phone booth
Reading hardcover books with any visual aids the respondent uses
Reading large-type books/newspapers with any visual aids respondent uses
Reading newspaper column headlines with any visual aids respondent uses
Seeing what one has written by hand after one has written it
Using measuring spoons in the preparation of a meal
Grating, peeling, and chopping foods in the preparation of a meal
Mixing things together in the preparation of a meal
Cutting food and buttering bread when alone in a restaurant
Recognizing a familiar face if the face is located next to one

A-level problems in both "yes" and "sometimes" analyses:

Walking outdoors alone (at least under some circumstances)
Walking outdoors alone in comfort in a familiar area
Walking alone on a cloudy day
Getting onto a bus
Finding where to pay the fare when riding on a bus
Traveling up or down an escalator
Cutting one's own food and buttering one's own bread when with someone else in a restaurant
Reading front-page headlines with any visual aid the respondent uses
Writing with either a pen or a pencil
Watering the grass, plants, flowers, etc.
Using a telephone
Using a pushbutton telephone

significant visual component; with appropriate visual aids they could no doubt successfully cope with many other tasks.

All told, we found 152 VEAPs in the responses to the closed-ended questions. Of these, 77 involve general seeing at a distance (not including reading), 17 involve reading at a distance, 30 involve general seeing at fairly close range (i.e., within arm's length, not including reading), and 28 involve reading up close (i.e., within 18 inches, words either printed or handwritten).

Examination of the data in Tables 3.2, 3.3, and 3.4 reveals some general trends. First, it appears that the number of "general seeing at a distance" problems and "general seeing at fairly close range" problems increases somewhat with a decrease in apparent problem severity (as perceived by the respondents). "Reading at a distance" problems, on the other hand, decrease dramatically in number with a decrease in the level of apparent problem severity. "Reading up close" problems appear to be distributed roughly equally relative to the various levels of apparent problem severity.

Additionally, we found a tenuous inverse relationship between the number of problems involving rapid adjustment to low illumination and the degree of apparent problem severity. We are hesitant to draw any conclusions from this result, however, because in many cases there was some uncertainty about the respondents' interpretations of the questions they were asked about these problems.

In addition to these preliminary analyses, we used χ^2 tests to investigate the relationship of responses to sex, age group, reading and mobility acuities, and reading and mobility fields. For the purpose of this analysis, ages were collapsed into three groupings: 21 through 44, 45 through 64, and 65 and over. Acuity and field categories were collapsed into two groupings: acuities and fields rated at 3, 4, or 5 were considered "serious," and those rated at 1 or 2 were considered "not serious." Moreover, all VEAP questions with multiple responses were collapsed into binary categories ("yes" or "no").

Where appropriate throughout this chapter, we will report significant χ^2 results. Interpretations of these relationships are sometimes obvious, sometimes opaque (particularly in the areas of acuity and field). These data suggest that research is needed to refine the measurement of functional residual vision and to establish empirical correlations between such measures and classes of VEAPs.

PROBING THE VEAPS

This section discusses the responses to questions that inquire about potential VEAPs or that lead up to such questions. Responses to both closed- and open-ended questions are considered here. In the case of open-ended questions, there are frequently more responses than respondents; this occurred because respondents were permitted to give multiple responses, and all applicable answers were coded.

Results are organized by topic, so that, for example, responses to questions about reading, writing, classroom experiences, and library use are discussed together. Within each topic, we first report numerical findings and then comment on them. Where appropriate, χ^2 results are also reported. Although this section covers the VEAPs in some detail, it does not include material about the use of visual aids, the respondents' attitudes toward the problems of being partially sighted, or the related activity levels of the partially sighted (see Chapters 4 and 5).

Tables that follow include responses to closed- and open-ended questions. With closed-ended frequencies we denote either the total number of respondents who answered the question and percentages for each response category, or simply the number of respondents in each category. When we refer in the text to the percentage of respondents who gave specific answers to queries, we refer, of course, to the percentage of those respondents who answered the particular question ("n" is given in the tabular material). With open-ended questions,

which allowed for multiple responses by each respondent, we list only the number of times a relevant response was given.

Mobility

Walking Outdoors. Almost all respondents (89 of 94) reported that they sometimes move about outdoors by themselves. The other 5 gave various reasons for not doing so: poor vision, and fears of becoming lost, of being alone, of automobiles, and of dogs.

Table 3.5 shows the respondents' answers to questions about the degree of comfort they experienced in moving around outdoors. As one might expect, partially sighted persons are much more comfortable walking in a familiar neighborhood than in an unfamiliar one--respondents cited a number of visually related circumstances that increase or decrease their comfort.

As shown in Table 3.6, a large majority of those responding wear eyeglasses or contact lenses outdoors, and even more (74 percent) wear sunglasses at least part of the time. Of those responding, 43 percent use white canes, and a very small number (3 percent) use guide dogs. Only one-third of those persons who mentioned the use of visual aids other than eyeglasses and contact lenses, such as telescopic spectacles, binoculars, and monoculars, always use such aids for accomplishing the tasks listed in Table 3.7. Among all respondents who use visual aids, the largest percentage use them to read street names and numbers and names on buildings.

Table 3.8 lists various objects that a person with impaired vision might bump into or trip over when walking alone outdoors, and shows how many respondents regarded each object to be a problem. Over 25 percent reported big problems with curbs when descending, small objects (such as sprinklers, skates, and skateboards) in the path of travel, and wires and branches at head or foot level. More than half regarded these same hazards as at least a small problem, along with bicycles and their riders, and branches and wires at waist level. On the other hand, less than one-third reported even a small problem with trees, lamp posts,

Table 3.5

VARIABLES AFFECTING VISUAL COMFORT OUTDOORS

Variable	Number of Respondents or Responses	Percentage
Familiar neighborhood (Q151)	n=89	
Very comfortable		84%
Somewhat comfortable		14%
Somewhat uncomfortable		2%
Very uncomfortable		--
Unfamiliar neighborhood (Q152)	n=86	
Very comfortable		15%
Somewhat comfortable		39%
Somewhat uncomfortable		27%
Very uncomfortable		19%
Circumstances in which comfortable (Q153)		
Familiar streets and blocks	29	
Familiar areas	19	
Own yard	10	
Daytime or sunlight	10	
Paths or hiking trails	6	
Parks or gardens	6	
Dim day	3	
In company of fully sighted person	3	
Woodsy, rocky areas	2	
Using white cane	2	
Uncrowded area	2	
Others	13	
Circumstances in which uncomfortable (Q154)		
Unfamiliar areas	21	
Night	17	
Unfamiliar streets and blocks	9	
Woodsy areas	6	
Heavy traffic	6	
Daytime or sunlight	6	
Crowded areas	5	
Rain	5	
Areas with construction	4	
Areas with steps	4	
Paths or hiking trails	3	
Dim cloudy day	3	
Isolated areas	2	
Others	8	

Table 3.6

USE OF AIDS OUTDOORS

Aid	Number of Respondents	Percentage
Eyeglasses or contact lenses (Q155)	n=90	
Yes		72%
No		28%
Sunglasses (Q156)	n=90	
Yes		74%
No		26%
How often? (Q157)	n=65	
Always		31%
Frequently		31%
Occasionally		18%
Rarely		8%
Depends on weather		12%
Guide dog (Q158)	n=90	
Yes		3%
No		97%
White cane (Q160)	n=89	
Yes		43%
No		57%
Purpose of white cane (Q161)	n=36	
To avoid obstacles		50%
To indicate impairment to sighted people		42%
To obtain lower bus fare		6%
Unspecified		3%

Table 3.7

USE OF VISUAL AIDS OUTDOORS FOR SPECIFIED PURPOSES

Do you use visual aids besides eyeglasses or contact lenses? (Q164)	Number of Respondents		
	Always	Sometimes	Never
To ascertain status of traffic signal	4	6	12
To determine street name	6	15	1
To determine number on building	7	13	1
To determine name of store or building	5	13	3
To see cars at intersection	3	3	16

Table 3.8

POTENTIAL BARRIERS TO OUTDOOR ACTIVITY

Barrier (Q165)	Number of Respondents		
	Big Problem	Small Problem	Almost No Problem
Trees, lamp posts, utility poles	4	17	69
Parking meters	3	18	66
The poles of stop signs	3	11	75
Fire hydrants	9	10	71
Low hedges and bushes	7	31	52
Open doors and windows on hinges that swing open to the outside	18	20	41
Trash cans, crates, and boxes	10	18	61
Curbs that drop off or slope down	27	40	21
Curbs where you have to step up	9	27	54
Parked cars	2	12	76
Other pedestrians	12	25	53
Bicycles and their riders	20	25	44
Bicycles, carriages, strollers, etc., left on the sidewalk	22	17	49
Skates, skateboards, or other small things left in your path	24	27	30
Wires and branches at:			
Head level	38	24	27
Waist level	20	23	38
Foot level	26	30	30
Sprinklers mounted in the ground	30	35	24

utility poles, parking meters, stop signs, fire hydrants, and parked cars.

Further investigation of these results yielded the following findings. Objects at eye level (e.g., branches) while walking ($p < .01$) present a disproportionately frequent problem for respondents with the most serious $field_m$ problems. The situation with objects at foot level appears anomalous. Those with less serious acuity impairments reported significantly more frequent problems. Specifically, regarding branches at foot level, this relationship held for $acuity_m$ ($p < .07$).

In response to an open-ended question about other obstacles that give them trouble, a number of respondents cited broken pavement, tree roots, hoses, chairs, benches, shopping carts, brick paths and sidewalks, small children, animals, ice and snow, and grassy areas.

As shown in Table 3.9, almost all respondents walk about outdoors in the daytime, while more than half do not walk around by themselves at night on dimly lit or dark streets. At least part of this reluctance to walk about at night may be due to factors other than poor eyesight (for example, fear of assault or robbery). Of those respondents who do go out at night, about one-third said they were bothered at least sometimes by headlights or wet surfaces. However, nearly one-fifth are bothered by wet surfaces in the daytime, and it is possible that the same proportion of fully sighted pedestrians would report problems with wet surfaces.

More respondents (79 percent) have serious difficulty going from bright daylight to a darkened room than vice versa (57 percent). Nevertheless, both of these transitions appear to be very difficult, at least sometimes, for most of the respondents.

When we asked respondents about crossing the street, most said that with any visual aid they use, they can at least sometimes see critical items such as open manholes and traffic islands (Table 3.10). The item that seems to present the most serious problem is "the arms of a policeman directing traffic."

Table 3.9

OUTDOOR ILLUMINATION

Do you walk alone outdoors: (Q166)	Number of Respondents		
	Yes	Sometimes	No
In bright sunlight	79	4	6
On a cloudy day	82	4	3
At twilight	61	14	14
At night on brightly lit streets	42	13	34
At night on dimly lit streets or in moonlight	31	10	48
At night when it is very dark	30	6	53

Table 3.10

PROBLEMS ENCOUNTERED WHEN CROSSING A STREET

With any aids that you use, can you see: (Q173)	Number of Respondents		
	Yes	Sometimes	No
Open manholes and trenches in the street	53	19	10
Traffic islands	65	12	7
The lines painted on the street that mark crosswalks	77	4	7
The arms of a policeman directing traffic	34	27	11

Table 3.11 shows respondents' answers to the open-ended question, "How do you cross the street in the daytime with any aids you use?" Most respondents use sensory cues (e.g., traffic signals, other people crossing, sounds of traffic); others display white canes to drivers.

Some partially sighted persons are able to see the yellow traffic light in daytime but not the red or green light. A number of these respondents view the traffic signal at right angles to the direction in which they wish to proceed. When that signal turns yellow, they know that the next change will produce a green light in the desired direction.

Table 3.11

METHODS FOR CROSSING STREETS

How do you cross the street in daytime with any aids that you use? (Q169)	Number of Responses
I use traffic signals and crosswalks	23
I cross when other people cross	22
I use cars as an indicator	21
I note when cars are in motion or at rest	21
I listen to the sound of traffic	20
I am able to see traffic signals	11
I am unable to see traffic signals	10
I view the adjacent signal	6
I use my white cane to indicate to drivers that I have trouble seeing	5
I use the crosswalks	3
I listen for traffic	3
I don't cross streets alone	3
I listen to clicks in the traffic signal	1

As shown in Tables 3.12 and 3.13, respondents have a variety of methods for finding streets, addresses, and stores, and most are able to accomplish these tasks either alone or by asking for help. For finding street addresses, many respondents find advance preparation useful; to find a store, some respondents use their nonvisual senses (especially smell and hearing).

Table 3.12

METHODS FOR FINDING ADDRESSES

How do you find a street and address, with any aid you use? (Q170)	Number of Responses
I ask someone on the street or in the area for help	28
I prepare a route in advance, use a map, or get directions before starting out	23
I go up close to read addresses	21
I familiarize myself with the area in question	18
I look for the addresses and street numbers	15
I never find a strange place alone	13
I can see street signs and numbers	9
I use a monocular	8
Someone escorts me	7
I use my telescopic lenses	2
I use binoculars	1
I use a magnifying device	1
I never look for street numbers	1

Table 3.13

METHODS FOR FINDING STORES

How do you find, for example, a drugstore, restaurant, or dry cleaner when you are on a strange street in the midst of many stores and buildings? (Q172)	Number of Responses
I look for identifying signs	29
I use my sense of smell	17
I look for particular types of buildings	16
I look for window displays	14
I look for the general appearance	11
I listen for telltale noises	5
I go up close	5
I use a monocular	4
I am familiar with where they are	4
I ask for help	4
I look from across the street for them (using an aid)	1

Bus Travel. Of 89 persons who responded, almost 90 percent take city buses by themselves, and two-thirds of these take buses frequently (Table 3.14). Although most bus-takers said they have no trouble locating a bus stop, over 75 percent find it difficult to read the signs at bus stops and 90 percent encounter problems in reading the name and number of the bus. We cannot help but ask whether these problems could be solved, at least in part, by the use of appropriate visual aids. Not only would such aids have to be prescribed, but the persons using them would have to be trained to use them effectively.

Table 3.15 shows the answers given to the open-ended question, "How do you find the bus you want to take?" Most respondents rely on other passengers or the driver to give them information. Once again, visual aids could probably increase the independence of our respondents in this situation.

Most respondents said they have no trouble getting on or off the bus, determining where to pay the fare, or finding an empty seat (Table 3.14). Tables 3.16 and 3.17 give the responses, respectively, to the questions "How do you pay the fare?" and "How do you find an empty seat?"

While most respondents reported no difficulty telling when a familiar stop is coming up, nearly 85 percent said they have trouble when the stop is unfamiliar (Table 3.14). However, finding an unfamiliar stop when traveling on a bus can be a formidable problem even for fully sighted persons. Tables 3.18 and 3.19 give, respectively, respondents' methods for finding a familiar stop and an unfamiliar stop; Table 3.20 lists their problems with getting off the bus.

Table 3.14

BUS TRAVEL ALONE

Variable	Number of Respondents	Percentage
Bus-taking (Q176)	n=89	
Yes		88%
No		12%
How frequently? (Q178)	n=78	
Frequently		67%
Occasionally		19%
Rarely		14%
Trouble finding bus stop? (Q179)	n=78	
Yes		13%
Sometimes		15%
No		72%
Trouble reading signs at bus stops? (Q181)	n=77	
Yes		76%
No		24%
Trouble reading name and number of bus? (Q182)	n=76	
Yes		90%
No		10%
Trouble boarding buses? (Q184)	n=77	
Yes		6%
No		94%
Trouble determining where to pay fare? (Q186)	n=77	
Yes		3%
No		56%
Travel free of charge because of white cane		41%
Trouble finding empty seat? (Q188)	n=77	
Yes		30%
No		70%
Trouble telling when familiar stop is coming up? (Q190)	n=77	
Yes		29%
Sometimes		12%
No		59%

(continued on next page)

Table 3.14--Continued

BUS TRAVEL ALONE

Variable	Number of Respondents	Percentage
Trouble telling when unfamiliar stop is coming up? (Q192)	n=77	
Yes		84%
Sometimes		3%
No		9%
Never travel on buses alone		4%
Trouble getting off the bus? (Q194)	n=77	
Yes		16%
No		84%

Table 3.15

METHODS FOR FINDING CORRECT BUS

How do you find the bus you want to take? (Q183)	Number of Responses
I ask the driver	36
I ask a nearby person	19
I stop the bus and ask (the driver)	16
I'm familiar with the route, or I know it's the only bus that stops there	12
I just ask someone	10
I read the bus number and recognize the length of the bus line name	9
Bus drivers stop for persons with a white cane; people help persons with a white cane	8
I use a monocular	2
I go to the end of the line to gain time for determining the name and number of the bus	2

Table 3.16

METHODS FOR PAYING FARES

How do you pay your fare? (Q187)	Number of Responses
I know where the box is located	9
I can see the box and its slot	7
I see the box and find the slot by touch	5
I hand the fare to the driver	2
I use a pass	2
I feel for the box and the slot in the box	1

Table 3.17

METHODS FOR FINDING EMPTY SEAT

How do you find an empty seat? (Q189)	Number of Responses
I scan each side of the bus	24
Passengers on the bus give me a seat or show me to a seat	14
The driver shows me an empty seat	9
I use my white cane	8
I head for the back of the bus	2
I ride the bus with someone else	2
I sometimes begin to sit in an occupied seat	2
I travel on buses at nonpeak hours	1

Table 3.18

METHODS FOR FINDING A FAMILIAR BUS STOP

How do you tell when a familiar stop is coming up? (Q191)	Number of Responses
I look for landmarks and pay attention to things coming up	27
I ask the driver to call out stops	22
I am familiar with route	14
I know the sequence of turns and curves	6
I estimate the time span between stops	3
I count the stops	1
I ask another passenger for help	1
I listen to what other passengers are saying (in the hope that they will give clues about the bus stops)	1
I ride with someone else who sees better than I do	1

Table 3.19

METHODS FOR FINDING AN UNFAMILIAR BUS STOP

How do you tell when an unfamiliar stop is coming up? (Q193)	Number of Responses
I ask the driver to call out the stop	56
I ask a fellow passenger	11
I'm familiar with the route	1
I look for landmarks	1
I follow the sequence of turns and curves	1
I use a monocular	1
I use an aid	1
I ride with someone else	1
I sometimes miss my stop	1
I can see the stops and the signs	1

Table 3.20

PROBLEMS GETTING OFF THE BUS

Problem (Q195)	Number of Responses
I have trouble with the bus steps	3
I am bothered by obstructions at the bottom of the steps	3
I have trouble determining the depth of the stairs	2
I use my cane to nudge feet out of my way	1
I become nervous and slow	1
I am bothered by curbing (that presents me with a low-contrast image)	1

Problems with Taxis. Nearly two-thirds of our respondents said they have taken taxis by themselves since their visual problem developed, but of these, more than two-thirds take taxis rarely and only a few take them frequently (Table 3.21). Because they cannot read the meter, most partially sighted persons are at the mercy of the cab driver (Table 3.22). While most cab drivers probably do not try to cheat visually impaired persons, some do. A possible solution would be to discuss the fare in advance, although even this procedure will not deter dishonest cabbies.

Table 3.21

TAXI TRAVEL ALONE

Variable	Number of Respondents	Percentage
Taxi-taking (Q360)	n=94	
Yes		60%
No		40%
How often? (Q361)	n=55	
Frequently		7%
Occasionally		24%
Rarely		69%

Table 3.22

PROBLEMS WITH TAXIS

What problems related to your vision do you encounter when taking a taxi? (Q362)	Number of Responses
I can't read the meter	39
With reluctance I have to trust the driver	11
I trust the driver's honesty	7
I have trouble hailing a cab	3
I can't see the cab when it arrives at my house	2
I can't give directions to the driver	1

Problems with Planes and Airports. Fully 90 percent of our respondents travel by plane, but less than half travel alone more than rarely (Table 3.23). Only 7 percent of those who rarely or never fly alone said that they do not fly because of their vision, but when we asked the more frequent plane travelers to rate the difficulty of specified tasks, their answers revealed that many of these tasks are problematic (Table 3.24). If we interpret "don't do" to be equivalent to "can't do" in Table 3.24, we find that the following tasks are serious problems for our respondents: determining the departure time and gate number from a board, finding an assigned seat, changing planes, and finding the gate. Table 3.25 shows the responses to the open-ended question, "Can you think of any other trouble you have with plane travel and airports?" and Table 3.26 gives respondents' ideas for changes that would help to meet the needs of the partially sighted.

Table 3.23

AIRPLANE TRAVEL ALONE

Variable	Number of Respondents	Percentage
Do you ever travel by plane? (Q455)	n=94	
Yes		90%
No		10%
Do you travel alone by plane: (Q456)	n=84	
Frequently		16%
Occasionally		32%
Rarely		27%
Never		25%
Why don't you fly alone more often? (Q457)	n=44	
Visual problems		2%
Visual problems and other reasons		5%
Other reasons		93%
Are there ways airports could change to meet the needs of persons with poor vision? (Q463)	n=84	
Yes		58%
No		42%

Table 3.24

ACTIVITIES IN AIRPORTS AND ON PLANES

How much of a problem is each of the following when you try to do it alone? (Q459)	Number of Responses			
	Big Problem	Small Problem	Almost No Problem	Don't Do
Locating the ticket counter	2	12	20	7
Checking in baggage	0	5	28	8
Determining the departure time and gate number from a board	15	7	5	14
Finding the gate	5	10	16	10
Finding your assigned seat	9	8	10	14
Finding the restroom on the plane	1	4	28	8
Determining whether the restroom is unoccupied	3	9	21	8
Finding the baggage claim area	4	13	15	9
Locating your own baggage	5	6	20	10
Changing planes	3	4	13	21

Table 3.25

OTHER TROUBLES WITH PLANES AND AIRPORTS

Problem (Q462)	Number of Responses
I have trouble using airport lockers and restrooms	5
I have difficulty using silverware in plastic packages, and seeing "fasten seat belt" and "no smoking" signs on the plane	3
I have trouble using stairs that lead to or from a plane	1
I have difficulty reading my plane ticket	1

Table 3.26

WAYS IN WHICH AIRPORTS COULD IMPROVE

How could airports change to meet the needs of persons with poor vision? (Q464)	Number of Responses
They should use signs that are larger and closer to eye level, and that contain letters and numbers in high contrast to the background on which they are printed	13
They should employ (more) persons who are easy to identify and who can give help to those who need special assistance	13
Gates should be more clearly marked	5
They should use larger TV information screens and should place them closer to eye level	4
They should be equipped with maps showing airport layout (and these maps should be at eye level and perhaps have raised symbols)	3
They should keep their public address systems in better working condition	2
It might be useful to give directions via floor markings (e.g., a green line on the floor leading to a particular concourse)	1
They should mark the leading edge of stairs (risers and runners) with a color in high contrast with the color of the stairs	1
They should use larger print on tickets	1

Problems with Hotels and Motels. Half of our respondents rarely or never stay at hotels or motels; about 10 percent of these said they do not stay at hotels or motels because of their vision (Table 3.27). We asked those who sometimes stay in hotels or motels by themselves to rate the difficulty of certain relevant tasks. The results, shown in Table 3.28, have to be regarded as tentative at best, because of the small sample. Nonetheless, two possible problems emerged: filling out a room registration card, and finding one's room for the first time when alone and without help from hotel or motel personnel. Table 3.29 shows answers to the question, "Are there any other problems you have

in hotels and motels?" From that table there is some indication that some partially sighted persons may have difficulty moving about a strange hotel or motel room and may find it difficult to locate light switches and electrical outlets.

Table 3.27

USE OF HOTELS AND MOTELS

Variable	Number of Respondents	Percentage
Frequency of hotel or motel use (Q449)	n=93	
Frequent		5%
Occasional		45%
Rare		39%
Never		11%
Why don't you stay in hotels or motels more often? (Q450)	n=45	
Visual problems		9%
Visual problems and other reasons		2%
Other reasons		89%
How often are you with someone else when you stay in a hotel or motel? (Q451)	n=56	
Always		50%
Sometimes		50%

Table 3.28

ACTIVITIES IN HOTELS AND MOTELS

To what degree is each of the following a problem for you when you stay in a hotel or motel? (Q452)	Number of Respondents			
	Big Problem	Small Problem	Almost No Problem	Don't Do
Finding the check-in desk	1	2	15	2
Filling out the registration form	4	6	5	4
Following the person who leads you to your room	0	3	16	1
Finding the room alone if there is no one there to lead you	2	8	9	1
Finding items of furniture in the room and not bumping into them	0	4	16	0
Finding your way back out of the building	1	6	13	0
Finding your room again after being out	1	3	16	0
Finding things like the hotel or motel restaurant, cocktail lounge, newspaper stand, and gift shop	0	7	12	1

Table 3.29

OTHER PROBLEMS WITH HOTELS AND MOTELS

Problem (Q454)	Number of Responses
I have trouble moving around in my room and in hallways	4
I have trouble finding and using room temperature controls, the TV, or the radio	3
I have difficulty reading posted signs	2
I find it hard to locate the light switch if it is not near the entrance to my room	2
I bump into or fall over luggage, poolside chairs, etc., in public areas	1
I find it hard to locate electrical outlets when I want to shave or use a hair dryer	1
I find it difficult to check my bill	1

Table 3.30

VISITING PUBLIC BUILDINGS

Variable	Number of Respondents	Percentage
Going to public or office buildings alone (Q206)	n=89	
Yes		87%
No		13%
How often? (Q207)	n=77	
Frequently		43%
Occasionally		43%
Rarely		14%
Difficulty finding buildings for the first time? (Q208)	n=76	
Yes		45%
Sometimes		18%
No		37%

Public Buildings

As shown in Table 3.30, almost 90 percent of those responding go to public buildings by themselves; nearly half of these do so frequently. About half of the respondents reported difficulty finding the building if they have not been there before.

Table 3.31 contains a list of areas that we thought could cause problems for partially sighted persons upon their first visit to a particular public or office building. We asked each respondent how often each area is a problem. As the table shows, more than half of the respondents have trouble finding the wall directory, reading the wall directory, and finding the particular office wanted in the building. Table 3.32 shows the respondents' suggestions for wall directories and room numbers.

Table 3.31

PROBLEM AREAS IN PUBLIC OR OFFICE BUILDINGS

How often is it a problem for you to find: (Q209)	Number of Respondents		
	Usually a Problem	Sometimes a Problem	Almost Never a Problem
Entrance to the building	13	16	48
Lobby receptionist	10	21	41
Wall directory	21	21	27
Office you want on the directory	39	21	9
Particular office you want to go to	27	22	26
Elevator or staircase	11	22	43

Table 3.32

SUGGESTIONS FOR WALL DIRECTORIES AND ROOM NUMBERS

Suggestion (Q210)	Number of Responses
The numbers and letters should be placed closer to eye level	29
The numbers and letters on directories should be larger	15
Use better lighting (on the wall directory and in the hallways)	11
Use better contrast between letters and background	9
The numbers and letters on signs should be larger	8
Use raised symbols	8
Place directories closer to entrances	6
Use braille numbers	4
Post someone at the door to help people, or have an information phone	4
Provide a floor plan or map	2
Place signs consistently	2
Place a sound emitter at the elevator, to reveal where the elevator is	2
Use nonglare glass over directories	1
Use clearer lettering and simpler type	1
Issue an information booklet	1
Paint the leading edge of stairs in a highly contrasting color	1
Indicate the building address in large numbers on a large mat at the doorway	1
Use color-coded handles and door knobs	1

Stairs. Table 3.33 lists answers to questions about negotiating stairs. The most important finding here is that respondents are much more worried about descending stairs than about ascending stairs. Concern about descending staircases was qualified in two interesting ways. (1) Noticing descending stairs was reported more frequently as a problem by women than by men ($p = .02$), and was also a problem significantly more often for respondents with serious $field_m$ defects. (2) Negotiating descending stairs was reported significantly more often to be a problem for the younger groups than for the older groups ($p < .01$). Specifically, the percentages responding affirmatively to this problem by age group are: age 21-44, 67 percent; age 45-64, 48 percent; and 65 and older, 22 percent. This distribution suggests that the older respondents may tend to avoid unfamiliar areas, may be more careful in approaching stairs, or, if possible, may avoid using stairs, while the younger respondents are more likely to be working and going to unfamiliar areas.

Table 3.33

NEGOTIATING STAIRS

In the daytime and in good lighting, are each of the following a problem for you? (Q217)	Number of Respondents		
	Yes	Sometimes	No
Noticing flights of stairs that go down	29	19	45
Noticing flights of stairs that go up	7	13	73
Finding the first stair and walking down a flight of stairs	34	15	45
Finding the first stair and walking up a flight of stairs	6	11	77
Occasional stairs that lead down in homes, patios, and yards	45	19	29
Occasional stairs that lead up in homes, patios, and yards	29	16	49

The problem of detecting and negotiating stairs can be easily and inexpensively ameliorated by marking the leading edges of stairs, on both the runner and riser, with a paint or non-skid material that has a color and gray value that are in high contrast to the color and gray value of the stairs themselves. These markings should run the entire width of the stair, and if they were 5 cm wide on both the runner and the riser, they would be clearly visible in good lighting to persons with visual acuities as poor as 20/1000 at distances of greater than 3.4 meters (11.2 feet).

Elevators and Escalators. All but one of our 94 respondents use elevators. Most said they are able to see whether the elevator is going up or down when they are standing outside it, but about half reported problems with pushing the button for the right floor and telling whether they have reached it (see Table 3.34).

Respondents have a variety of techniques for determining whether they have reached the right floor; some of these techniques are listed in Table 3.34, but two deserve special attention: (a, 4 respondents) "I watch the lights in the button panel; when all those below (above) the floor I want go out, I know that my floor is the next one." (b, 2 respondents) "When I'm alone on an elevator, I push the button for my floor and after the elevator moves on and its doors reopen, I push my floor button again. If I have arrived at the right floor, the elevator door will remain open, or it may close and then open again without the elevator moving up or down. If I have not arrived at the right floor, the elevator door will close and the elevator will move on. When it stops again, I once more push the button for my floor, watch what happens, and, depending on what happens, either get off the elevator or continue on until I reach my floor."

The former technique is useful in elevators equipped with a panel of floor buttons that light up when pressed and then go out individually when the elevator reaches the floor corresponding to a lighted button; because the buttons are much closer to eye level than is the panel above the door, they are considerably easier for partially sighted persons

Table 3.34

USING ELEVATORS

Variable	Number of Respondents or Responses	Percentage
Elevator Use (Q219)	n=94	
Yes		99%
No		1%
How do you tell from outside whether an elevator is going up or down? (Q220)		
I see the indicator lights	59	
I ask someone for help	18	
Trouble pushing the button for the right floor? (Q221)	n=91	
Yes		48%
No		52%
Trouble telling whether you have reached the floor you want? (Q222)	n=92	
Yes		54%
No		46%
How do you tell whether you have reached the floor you want? (Q223)		
I can see the lights and arrows	26	
I ask other passengers for help	24	
I just guess and get off	10	
I get off the elevator, check room numbers, and reenter the elevator if it's the wrong floor	7	
I count the dings as the elevator passes the floors	5	
I ride the elevator until someone else gets on	4	
I try to use only familiar elevators	3	
I don't ride elevators alone	3	
I try to stand in the front of the elevator to see the floor numbers better	2	
When the elevator stops, I push the button for the floor I want. If it's the right floor, the elevator door opens again; if not, it moves on	2	

to see. The second technique, which we found particularly ingenious, works even in elevators that do not have buttons that light up.

Whether finding the correct floor in an elevator is perceived as a problem depends on several factors. First, it tends to be reported more often as a problem by women than by men ($p = .09$). In addition, it is seen as a problem significantly more often by those in the youngest age group (21-44) than by those in the older group (age 65 and older), perhaps because younger persons use public buildings more often ($p = .01$). In addition, determining the correct floor was systematically perceived as a problem by those with $field_m$ impairments ($p = .05$) and by those with $acuity_m$ impairments ($p = .05$).

When asked whether they have problems using escalators, 67 percent of those responding (92) said yes and 33 percent said no. Table 3.35 lists problems reported by the 62 persons who do use escalators. According to this table, the respondents have very little trouble with escalators; however, it must be remembered that one-third of our sample do not use escalators at all, presumably because of visual problems.

Table 3.35

ESCALATOR PROBLEMS

	Number of Respondents	
Problem (Q225)	Yes	No
Getting on or off	12	50
Going up	2	60
Going down	6	56

Public Restrooms. Nearly all respondents use public restrooms; of these, 70 percent have trouble finding a restroom at least some of the time, and over half have trouble telling a women's from a men's restroom. Table 3.36 itemizes some of the ways in which they find restrooms and tell which is the right one.

Simply locating public restrooms, as might be expected, tends to be reported as a problem significantly more often for those with the most serious $field_m$ impairment ($p = .09$). Similarly, distinguishing between men's and women's restrooms is found to be a problem by those with more severe $acuity_r$ defects ($p = .04$). This problem can be solved simply and inexpensively. Up-raised panels about 2 feet square can be mounted on restroom doors. The panels should have distinctive shapes to identify men's and women's restrooms (e.g., an equilateral triangle for men and a circle for women). The panels for the two sexes also should be of a distinctly different color and gray value from each other and from that of the doors on which they are mounted. The result would be that partially sighted persons with as little as 20/4000 vision in their better eye could see the markings, and persons with at most light perception or light projection could feel the edge of the panels to distinguish a men's from a women's restroom.

Money, Shopping, and Restaurants

Money. All but two of our respondents handle paper money and checks; those two said they do not handle money because of their vision. As many as 30 percent at least sometimes let a clerk pick out coins or bills from their hands, and 35 percent do not count their change (Table 3.37). Nearly 90 percent of the respondents have a checking account. Table 3.37 lists their methods for telling the correct value of coins and bills, and for writing checks and deposit slips.

Shopping. Over 90 percent of our respondents shop in department or discount stores and in supermarkets or grocery stores. Most of those who do not said that this is due to their vision. Tables 3.38 and 3.39 give responses to closed- and open-ended questions about shopping.

Table 3.36

PUBLIC RESTROOM USE

Variable	Number of Respondents or Responses	Percentage
Use of public restrooms (Q226)	n=94	
Yes		97%
No		3%
Trouble finding restrooms? (Q227)	n=91	
Yes		58%
Sometimes		12%
No		30%
How do you find a restroom? (Q228)		
I ask for help	44	
I go up close to the door	17	
I ask for directions	14	
I ask someone to escort me	13	
I look by myself	9	
I watch the flow of traffic into and out of a suspected door. (If the flow is all male or all female, then I assume I'm at the restroom.)	2	
I look for a public telephone, because usually restrooms are near public telephones	1	
Trouble telling a women's from a men's restroom? (Q229)	n=91	
Yes		56%
No		44%
How do you tell a women's from a men's restroom? (Q230)		
I read the sign	19	
I go up close to the door to read the sign	17	
I judge by the length of the word ("men" or "women")	10	
I ask for help	10	
I watch who comes in or goes out the door	8	
I am always with someone	6	
I take pot luck	5	
I ask for directions	5	
I ask for an escort	5	
I have difficulty with signs consisting of human figures	5	
Low-contrast letters give me trouble	4	
I touch the name plate; if it has raised or depressed lettering, I'm in business	4	
Cute signs throw me (e.g., "guys" and "gals")	2	
I have trouble when the print on the door sign is small	1	
I have problems when the sign is too high on the door	1	
I look at the sign with my telescope	1	

(continued on next page)

Table 3.36--Continued

PUBLIC RESTROOM USE

Variable	Number of Respondents or Responses	Percentage
Other problems? (Q231)	n=91	
Yes		15%
No		85%
What problems? (Q232)		
I can't find towels, toilets, and soap	11	
I listen to detect noises that tell me where the toilet, sink, and towels are located	1	
I ask for help	1	
I rely on my cane to tell me where the toilet and sink are located	1	
I have trouble telling whether the toilet seat is up or down	1	
I have trouble in poor lighting	1	

Table 3.37

USE OF MONEY AND CHECKS

Variable	Number of Respondents or Responses	Percentage
Do you handle paper money and change? (Q352)	n=92	
Yes		98%
No		2%
How do you tell one coin from another? (Q354)	n=87	
By vision		32%
By touch		48%
By both vision and touch		20%
How do you tell a $1 bill from a $5 bill? (Q355)		
I use my eyes	64	
I separate the bills by denomination and/or I keep them in ascending or descending order	18	
I fold each denomination in a unique way	14	
Do you ever let a clerk pick out coins or bills from your hands? (Q356)	n=92	
Yes		17%
Sometimes		13%
No		70%
Do you count your change? (Q357)	n=91	
Yes		65%
No		35%
Do you have a checking account? (Q358)	n=92	
Yes		88%
No		12%
How do you write checks and deposit slips? (Q359)		
I obtain help from someone	25	
I write out my checks, but not my deposit slips	11	
I use a (hand) magnifier	9	
I use a check guide and materials with raised lines	5	
I use oversized checks with large print and raised lines	3	
I use a flashlight	1	

Table 3.38

SHOPPING IN DEPARTMENT OR DISCOUNT STORES

Variable	Number of Respondents or Responses	Percentage
Do you shop in department or discount stores? (Q331)	n=94	
Yes		95%
No		5%
Why not? (Q332)	n= 5	
Vision		80%
Vision and other reasons		20%
How often? (Q333)	n=89	
Frequently		38%
Occasionally		43%
Rarely		19%
Alone? (Q334)	n=72	
Yes		74%
No		26%
Are any stores particularly easy? (Q336)	n=72	
Yes		36%
No		64%
What could be done to make shopping easier in department or discount stores? (Q340)		
Larger price tags with larger numerals	22	
Better service and more help	21	
Larger signs and directories	10	
Price tags with greater contrast between numbers and background	7	
Wide aisles, kept clear	5	
Braille on tags, directories, and elevators	3	
Contrasting color on the leading edge of risers and runners on their stairs	3	
Consistent location of signs and directories	3	
Signs and directories closer to eye level	2	
Numbering aisles at both ends	2	
Marking prices on the front of the shelf	1	
Grouping merchandise by size, not brand	1	
Refraining from altering the arrangement of stock	1	

Table 3.39

SHOPPING IN SUPERMARKETS OR GROCERY STORES

Variable	Number of Respondents or Responses	Percentage
Do you shop in supermarkets or grocery stores? (Q341)	n=94	
Yes		91%
No		9%
Why not? (Q342)	n= 8	
Vision		75%
Other reasons		12.5%
Vision and other reasons		12.5%
How often? (Q343)	n=86	
Frequently		72%
Occasionally		19%
Rarely		9%
Alone? (Q344)	n=78	
Yes		86%
No		14%
Do you use visual aids when shopping in supermarkets? (Q345)	n=78	
Yes		82%
No		18%
How do you pick our fruits and vegetables? (Q347a)		
By feel, texture, and firmness	29	
By sight	10	
I shop with someone else	5	
I note the color	5	
Store personnel select for me	4	
I use the same criteria as sighted people	3	
I rarely buy those things	2	
I know the store I shop in; I tend to buy the same things	1	
I use a magnifier	1	
I ask someone for help	1	

(continued on next page)

Table 3.39--Continued

SHOPPING IN SUPERMARKETS OR GROCERY STORES

Variable	Number of Responses
How do you pick out meat, poultry, and fish? (Q347b)	
The butcher selects and marks it for me	12
I select it by sight	10
I shop with someone else	7
I read the labels	5
I tend to go to the same store and buy the same things	5
I use a magnifier	4
Store personnel select it for me	3
I use the same criteria as sighted people	3
I note the color	2
I examine the texture and firmness	2
I rarely buy those things	2
I use glasses or half-glasses	1
I examine the item close to my eyes	1
I ask for some help	1
How do you find out the prices of items? (Q347c)	
I read the prices on the labels or on the boxes	21
I ask someone for help	11
I use a magnifier	7
I shop with someone	7
I estimate the cost	5
Store personnel tell me the cost	5
I view the prices	4
I use glasses or half-glasses	2
I see the prices as they are rung up on the register	1
I check the receipt at home with my CCTV system	1
How do you find other packaged items? (Q347d)	
I know the store; I tend to buy the same things	18
I ask someone for help	10
I shop slowly and section by section	9
I shop with someone	6
Store personnel help me	5
I note colors	4
I read labels and brands	4
I use the same criteria as sighted people	4
I use my eyes	3
I bring items close to my eyes	2

Restaurants. Most respondents eat at restaurants, cafeterias, or fast food places at least occasionally (Table 3.40). Table 3.41 shows respondents' reports of whether they read the menu, read the check, and cut their own food when eating in a restaurant with someone else or alone. Reading the menu and reading the check seem to be fairly serious problems for our respondents.

We found age to be a significant factor in reading the menu ($p = .02$) and reading the check ($p = .05$). Younger respondents usually handle their own menu and check, while older respondents more often call on others for help. Both tasks were also influenced by acuity measures, those with the most severe $acuity_r$ impairments reporting the most problems with menus and checks ($p = .01$). $Field_r$ measures were also significantly related to such difficulties, those with most severe $field_r$ reduction reporting most problems with menus ($p = .06$) and checks ($p = .01$).

When asked whether getting to a table in a restaurant is ever a problem and what kinds of restaurants are most and least comfortable, respondents indicated that lighting is the most important factor affecting their ease of movement and general comfort in restaurants (Table 3.42). While low illumination in restaurants presents most partially sighted persons with a formidable problem when they try to follow someone to a table and when they try to read a menu, the problem is especially severe when they come into the restaurant from a bright daylight environment. As pointed out elsewhere, dark adaptation for many partially sighted persons takes much longer than it does for fully sighted persons, and before these partially sighted persons are dark adapted, they are effectively functionally blind. To avoid this temporary functional blindness, many partially sighted persons can wear glasses that filter out all the daylight except that at the red end of the spectrum for 10 or 15 minutes before entering the restaurant. To merely alleviate the problem, most partially sighted persons can use a flashlight to help them make their way to their table, and a penlight to read the menu. Even after dark adaptation, they may still need the

Table 3.40

GOING TO RESTAURANTS, CAFETERIAS, AND FAST FOOD PLACES

Variable	Number of Respondents	Percentage
Do you ever go to restaurants? (Q427)	n=93	
Yes		99%
No		1%
How often? (Q428)	n=92	
Frequently		54%
Occasionally		41%
Rarely		4%
Do you ever go to cafeterias? (Q439)	n=93	
Yes		88%
No		12%
How often? (Q440)	n=82	
Frequently		17%
Occasionally		32%
Rarely		51%
Do you ever to fast food places? (Q445)	n=93	
Yes		91%
No		9%
How often? (Q446)	n=85	
Frequently		26%
Occasionally		40%
Rarely		34%

Table 3.41

ACTIVITIES IN A RESTAURANT

Do you do each of these things when you are in a restaurant with someone else? (Q430)	Number of Respondents	
	Yes	No
Read the menu for yourself	39	49
Cut your own food and butter your own bread	86	2
Read the check yourself	41	46

What type of problem is each of these things when you are in a restaurant alone? (Q432)	Number of Respondents		
	Big Problem	Small Problem	Almost Never a Problem
Reading the menu	17	13	13
Cutting your own food and buttering your own bread	0	5	41
Reading the check	12	13	18

Table 3.42

PROBLEMS IN RESTAURANTS

Variable	Number of Respondents or Responses	Percentage
Do you ever have trouble getting to a table in a restaurant? (Q433)	n=88	
Yes		57%
No		43%
Under what conditions do you have trouble getting to a table? (Q434)	n=50	
When the lighting is low		86%
When given verbal directions for seating		6%
When following the host or hostess		8%
I sometimes bump into things and knock things over	2	
Under low restaurant illumination, people seem to blend into the background	2	
I have trouble with restaurants that are built on several levels	1	
Are there any kinds of restaurants in which you are particularly comfortable? (Q435)	n=88	
Yes		73%
No		27%
What makes you comfortable in a restaurant? (Q436)		
I like restaurants that are well lit	24	
I prefer restaurants that provide me with a clearly printed menu	2	
Are there any restaurants you avoid because of your poor vision? (Q437)	n=87	
Yes		47%
No		53%
What kind of restaurants do you avoid? (Q438)		
I avoid restaurants with poor lighting	25	
I stay away from restaurants that are dark or dim	14	

penlight to read the menu and check, because while the ambient lighting in the restaurant may be adequate for moving from place to place (after dark adaptation), it may not be sufficient for reading. Some persons--those with retinitis pigmentosa, for example--do not dark adapt and hence are effectively functionally blind in low illumination.

Locating a restaurant table was significantly more likely to pose a problem for women than for men ($p = .03$), a result that may reflect cultural role experience as well as visual parameters. Age also had a bearing on this problem; older groups were significantly less likely to report difficulties locating a table in a restaurant ($p = .07$). Finally, it was not surprising to learn that locating a table is experienced as a problem significantly more frequently by respondents with severe $field_m$ impairment ($p = .01$); a similar but less strong relationship ($p = .07$) was obtained for severe $acuity_m$ impairment.

Table 3.43 shows respondents' assessments of the difficulty of performing various tasks when alone in cafeterias. Because the number of respondents is small, we hesitate to draw any definite conclusions from these data. Still, there is every reason to think that determining what foods are on display and finding out the prices of foods in cafeterias are very serious problems.

This result is to be expected, because the foods in cafeterias are rarely at eye level and are usually too far away to be seen rapidly and clearly, even with the help of a sophisticated visual aid. Both rapidity and clarity are needed in a cafeteria because the line may be long; visual decisions must be made rapidly, and people in the line may become upset over what they consider unreasonable delay. In addition, food prices are usually posted on wall signs that are hard to read rapidly, even with visual aids.

When we asked those respondents who go to fast food places whether they can read the menu on the wall, 13 percent of those who responded (56) said yes, 23 percent said sometimes, and 64 percent said no. Here again, reading distant signs is a difficult problem.

Table 3.43

PROBLEMS IN CAFETERIAS

What degree of problem do you judge each of the following to be when you are alone in a cafeteria? (Q442)	Number of Respondents		
	Big Problem	Small Problem	Almost No Problem
Finding your way around to the right food counters	5	6	14
Being able to tell what foods are on display	10	9	6
Putting things on your tray	2	5	18
Finding forks, spoons, catsup, mustard, napkins, coffee, etc.	3	10	12
Finding out what things cost	13	7	5
Finding an empty table	7	3	14
Finding an empty seat at a table that is partly occupied	4	5	14
Finding where to put your tray after you have finished	5	7	13

Entertainment

Watching Television. Table 3.44 lists answers to questions about television. We find it noteworthy that more than half of those responding sit only one to three feet from their TV sets; this may be due, at least in part, to a lack of visual aids that would allow them to see from a greater distance without losing clarity.

About half of our respondents reported considerable difficulty in seeing television details. All six variables examined as potentially relevant to VEAPs were significantly related to difficulties seeing television details, even when using visual aids. Seeing TV details is reported significantly more often as a problem by women than by men ($p < .01$). Age is a factor as well, the 65-and-older group most often experiencing such difficulties and the youngest group experiencing them least often ($p < .01$). Seeing TV details also was significantly related to acuity and field impairments of both types ($p < .01$). It should be recalled, however, that age and seriousness of visual impairment are

Table 3.44

WATCHING TELEVISION

Variable	Number of Respondents or Responses	Percentage
How often do you watch television? (Q381)	n=94	
Frequently		69%
Occasionally		24%
Rarely		6%
Never		1%
Why don't you watch more often? (Q382)		
Visual problem	3	
Other reasons	3	
Visual problem and other reasons	1	
What kind of set do you usually watch? (Q384)	n=86	
Black and white		27%
Color		73%
How close to the set do you sit? (Q386)	n=85	
1-3 feet		52%
4-6 feet		23%
7 feet or more		25%
What level of detail can you see, with any aids you use? (Q387)	n=86	
Most details		51%
A few details		27%
No details		6%
Level of detail varies		10%
Don't know		2%
Other		4%
I can't see facial details	3	
I can't see print displayed on the screen	1	
I see only a small portion of the screen at one time	1	
I can't see the TV, I only hear it	1	
Can you read TV Guide or the television schedule printed in the newspaper? (Q388)	n=82	
Easily		42%
With some difficulty		24%
With much difficulty		6%
Not at all		28%

related factors (see Table 2.7, Chapter 2). In general, these results suggest that although TV viewing should pose fewer problems than other perceptual tasks, it is widely experienced as a problem. We conjecture that many respondents have never been introduced to the appropriate sorts of visual aids, since most of these persons should be able to make use of aids that would enable them to watch TV with an adequate level of detail. Although it is remediable, this situation should be seen as an important one that bears on the quality of life for less active, confined, and older partially sighted persons.

Over half of those responding said they had at least some difficulty reading TV information and schedules--again, a problem that could probably be relieved appreciably by appropriate visual aids.

Movies, Theater, and Sports Events. As shown in Tables 3.45 and 3.46, quite a large number of our respondents do not attend movies, the theater, or sports events because of visual problems. Once again, appropriate visual aids could make a great difference. As with TV detail, problems in seeing movie screen detail are reported significantly more often by women than by men ($p < .01$). With respect to visual parameters studied, only $field_m$ is significantly related to ability to see movie screen detail, with those having the most restricted fields reporting the most problems ($p < .01$). Among those who attend theater events, only those with seriously reduced $acuity_m$ report problems in seeing details ($p = .09$).

Table 3.46 lists reported difficulties in going to sports events; a number of problems were cited, nearly all of them visual. This is to be expected, since sports action moves so quickly and over such a wide field of vision that even sophisticated visual aids are often inadequate.

Participation in Sports and Hobbies. About three-fourths of our respondents participate in sports; an even greater percentage have hobbies (Table 3.47). However, of the 36 respondents who became partially sighted when they were 16 or older, over half reported they had given up certain sports or activities because of their vision.

Table 3.45

MOVIES AND THEATER

Variable	Movies		Theater	
	Number of Respondents or Responses	Percentage	Number of Respondents or Responses	Percentage
Do you attend? (Q389/394)	n=93		n=94	
Yes		57%		69%
No		43%		31%
Why not? (Q390/395)	n=39		n=29	
Vision		41%		28%
Other reasons		49%		66%
Vision and other reasons		10%		6%
Level of detail seen (Q392/397)	n=51		n=64	
Most details		47%		27%
Few details		39%		45%
No details		6%		11%
Varies		8%		9%
Other				8%
Preferred seating (Q393/398)				
First few rows	22		53	
Center	28		24	
Back	8		2	
Balcony	2		3	
Side	--		1	
Varies	--		3	

Table 3.46

SPORTS EVENTS

Variable	Number of Respondents or Responses	Percentage
Do you attend? (Q399)	n=94	
Yes		39%
No		61%
Why not? (Q400)	n=57	
Vision		37%
Other reasons		53%
Vision and other reasons		10%
Level of detail seen (Q402)	n=34	
Most details		32%
Few details		53%
No details		15%
Preferred seating (Q404)	n=23	
Close to action		56%
Middle distance		13%
Center		22%
Behind a screen, where r is likely not to get hit		9%
Problems at sports events (Q400/405)		
I have trouble moving around the stadium or arena, or I have trouble with stairs	14	
I have trouble finding my seat	11	
I can see the events better on television	10	
I have trouble finding a restroom	5	
I am bothered by crowds	4	
I have difficulty finding a refreshment stand	3	
My visual aids work poorly at these events	2	
I have trouble reading a food menu on the wall	1	
I have difficulty reading the scoreboard	1	
I have trouble finding an entrance or exit	1	

Table 3.47

PARTICIPATION IN SPORTS AND HOBBIES

Variable	Number of Respondents	Percentage
Do you participate in sports? (Q406)	n=94	
Yes		74%
No		26%
Why not? (Q407)	n=23	
Vision		39%
Other reason		44%
Vision and other reason		17%
Did you give up any sports because of your vision? (Q411)	n=36	
Yes		53%
No		47%
Did you ever try to carry out these activities after the onset of your visual loss? (Q413)	n=20	
Yes		65%
No		35%
Do you have any hobbies? (Q414)	n=94	
Yes		82%
No		18%
Have you tried to do the hobbies you gave up after the onset of your visual loss? (Q420)	n=18	
Yes		78%
No		22%

Table 3.48 lists both sports and hobbies in which our respondents now participate, and those which they gave up as a result of visual problems. Not surprisingly, significantly more men than women reported giving up participation in sports because of visual problems ($p = .02$).

Table 3.48

SPORTS AND HOBBIES PRACTICED AND GIVEN UP

Activity	Number of Respondents Who Participate in Activity	Number of Respondents Who Have Given up Activity
Sports (Q408/411)		
Hiking, walking	29	3
Swimming	19	3
Gym, calisthenics	17	1
Bike riding	16	2
Bowling	16	2
Track and field	5	1
Tennis	4	7
Outdoor chores	4	1
Dancing	4	1
Basketball	4	4
Golf	3	5
Yoga	3	0
Boxing, karate, judo	3	1
Body surfing	2	0
Water-skiing	2	0
Canoeing, kayaking	2	0
Football	2	2
Baseball, softball	2	11
Camping	2	0
Pool, darts, miniature golf, ping-pong	2	3
Skiing	1	3
Ice skating	1	3
Horseback riding, polo	0	3
Others	8	6
Hobbies (Q415/419)		
Reading	33	7
Music	20	1
Collecting	15	3
Social activities	14	4
Sewing, crocheting, etc.	12	4
Physical activities	10	3
Crafts	10	0
Arts	9	3
Gardening	7	1
Cooking	6	1
Archaeology	5	0
Pets	3	0
Travel	3	3
Spectator sports	3	1
Creative writing	2	1
Radio/CB	2	0
TV watching	2	1
Others	3	1

Reading, Writing, Classrooms, and Libraries

Reading and Writing. More than three-fourths of our respondents reported that they read ink-printed material, and over 90 percent do handwriting (Table 3.49). We were disappointed to learn that as many as 22 percent of the respondents are not reading; we suspect that with appropriate visual aids many of these persons could be doing so.

Table 3.50 lists answers to questions about the ability to read specified materials, with the help of any visual aids. It is interesting to note that with appropriate visual aids, no fewer than 71 percent of the respondents who are currently reading can read all the printed material listed in this table. However, only 29 percent said they can read handwriting. If the criterion is changed from "can read" to "can at least sometimes read," then 82 percent can sometimes read all the materials listed, including handwriting.

We had anticipated that reading what they write would be a serious problem for the partially sighted, but our results indicate the contrary. About 85 percent of those responding can at least sometimes read what they write while they are writing, and more than 90 percent can read what they write after they finish writing (Table 3.49).

Classroom Activities. Of those respondents who had taken classes together with fully sighted persons (Table 3.51), most believe that their visual problems limited their participation in class, particularly when a chalkboard was used. Because reading information from the board is so important a part of classroom work, it is imperative that partially sighted persons be provided with visual aids that enable them to see the chalkboard clearly and comfortably from a regular seat in the classroom. Going up to the chalkboard during class time is disruptive to the other students and demeaning to the partially sighted student. Doing so after class is also demeaning, and is also disadvantageous, occurring as it does after the material has been explained, and possibly already erased. (A detailed review of services to children with all types of handicaps, including partial sight, is available in Kakalik et al., 1973; Kakalik et al., 1974; and Brewer and Kakalik, 1979.)

Table 3.49

READING AND WRITING

Variable	Number of Respondents	Percentage
Do you read ink-printed materials? (Q130)	n=94	
Yes		78%
No		22%
Do you use any visual aid for reading (including eyeglasses)? (Q133)	n=73	
Yes		73%
Sometimes		23%
No		4%
Do you write? (Q141)	n=94	
Yes		92%
No		8%
Do you use any visual aid for writing (including eyeglasses)? (Q142)	n=86	
Yes		56%
Sometimes		21%
No		23%
Can you see what you write while you are writing (with any aids you use)? (Q144)	n=86	
Yes		66%
Sometimes		19%
No		15%
Can you see what you have written after you are finished writing? (Q145)	n=86	
Yes		76%
Sometimes		15%
No		9%
Do you write with a pencil? (Q146)	n=86	
Yes		27%
Sometimes		22%
No		51%
Do you write with a pen? (Q148)	n=86	
Yes		100%
What kind? (Q149)	n=84	
Felt tip		61%
Ballpoint		37%
Fountain		1%
Other		1%

Table 3.50

READING VARIOUS MATERIALS

With any aids that you use, are you able to read: (Q135)	Number of Respondents		
	Yes	Sometimes	No
Phone book	54	6	10
Dictionary	51	7	11
Paperback book	50	9	7
Hard cover book	55	9	5
Large-type book and newspaper	55	4	3
Front page headlines	69	2	2
Column headlines	64	5	4
Ordinary newspaper type	55	6	10
Handwriting	21	43	8

Table 3.51

CLASSROOM ACTIVITIES

Variable	Number of Respondents or Responses	Percentage
Since the onset of your visual problem, have you been in classes with fully sighted persons? (Q77)	n=39	
Yes		33%
No		67%
From any place in the room, were you able to see the chalkboard? (Q79)	n=64*	
Yes		56%
Sometimes		24%
No		20%
Do you have any special way that makes it easier for you to see the chalkboard? (Q82)		
I sit up close to the chalkboard, or I go up to the board	23	
I sit in or near the front row	11	
The teacher reads the material from the chalkboard for me	2	
I ask the teacher to write bigger	1	
I try to sit in a place from which I encounter no glare off the board	1	
I request more light	1	
How do you take notes in class? (Q83)		
I take my own notes	20	
I use a tape recorder	9	
I print and write with large symbols	8	
Someone takes notes for me	7	
I carbon copy or xerox a classmate's notes, or I copy a classmate's notes after class	6	
I use the teacher's notes	2	
I copy from the board during breaks and after class	1	
I work via a reader	1	
Do you have trouble copying things from the board? (Q85)	n=48	
Yes		71%
No		29%

(continued on next page)

*Difference in number of respondents is due to branching in the questionnaire.

Table 3.51--Continued

CLASSROOM ACTIVITIES

Variable	Number of Respondents or Responses	Percentage
Do you think your vision limits you in class discussions that depend on seeing things at a distance, such as the board? (Q87)	n=66*	
Yes		70%
Sometimes		6%
No		24%
Has this been a serious problem for you? How do you think you have been limited? (Q88)		
It has been a serious problem when I have had to see films, maps, slides, a chalkboard, etc.	15	
It has been a severe problem	9	
It has not been a severe problem	8	
I think it has made me less outgoing than I would otherwise have been	5	
I think that because of this problem I have had less general background knowledge than my classmates	4	
My special needs have tended to break the continuity of class discussion	1	
I haven't been able to tell when a question is being directed at me	1	
When the discussion has involved reading aloud, I have had trouble	1	
I felt embarrassed	1	
Can you think of any other problem you have had in class? (Q90)		
I have had trouble reading texts with small print	11	
Test taking was rough	7	
I have had trouble reading aloud in class	4	
I have had difficulty finding a seat and moving around in class	3	
I have been left alone; not much has been expected of me	1	
I have not gone on in school; I have restricted my choice of classes	1	
I have had problems with dating	1	
I have felt discriminated against	1	
I have been afraid	1	

(continued on next page)

*Difference in number of respondents is due to branching in the questionnaire.

Table 3.51--Continued

CLASSROOM ACTIVITIES

Variable	Number of Respondents or Responses	Percentage
Other problems (continued)		
I have perceived hostile reactions from others	1	
I have had difficulty in gym classes and playing sports	1	
I have had problems in laboratory classes	1	
I haven't been able to see when someone has nodded in answer to a question	1	
I haven't been able to tell when someone has handed me something	1	

Library Use. Almost half of our respondents do not go to the library, and about 70 percent of these said they do not go specifically because of their vision (Table 3.52). Table 3.53 indicates whether they use specified items and services that are sometimes available at libraries.

In their answers to the open-ended questions here and elsewhere in this analysis, respondents seemed obsessed with large print. We think this is a clear indication that not enough partially sighted persons have had good low vision examinations resulting in the prescription or recommendation of visual aids that would permit them to read smaller print. We contend that most persons who can read large print (e.g., 18-point type) could, with appropriate visual aids, read ordinary book print (e.g., 10- and 8-point type).

On the Job

Over nine-tenths of those responding think that their visual problems affect the kind of jobs they can obtain, and more than half who had stopped working said that they did so because of their visual problems (Table 3.54). Of the 42 who are currently working, about

Table 3.52

USING LIBRARIES

Variable	Number of Respondents or Responses	Percentage
Do you go to the library? (Q370)	n=94	
Yes		55%
No		45%
Why not? (Q371)	n=42	
Vision		69%
Other reasons		29%
Vision and other reasons		2%
I need more aids	2	
Not enough large-print books are available	2	
I need more than standard borrowing time to read the books	1	
Libraries are not well enough lit for me to read	1	
How frequently to you go to the library? (Q372)	n=52	
Frequently		17%
Occasionally		23%
Rarely		60%
Do you go alone or with someone else? (Q373)	n=21	
Alone		76%
With someone else		24%
Do you use the card catalog by yourself? (Q375)	n=21	
Yes		67%
No		33%
How do you find the books you want on the shelves? (Q377)		
I ask for help	11	
I take lots of time and am persistent	2	
I must get very close to the books and sometimes I have to take them off the shelves to identify them	2	
Could anything be done to make libraries easier for persons with visual problems? (Q379)	n=21	
Yes		86%
No		10%
Don't know		4%

(continued on next page)

Table 3.52--Continued

USING LIBRARIES

Variable	Number of Responses
What could be done to make libraries easier for persons with visual problems? (Q380)	
They should have larger catalog cards (presumably with larger type)	4
They should have better lighting	4
They should have larger and higher-contrast labels on books	4
They should be equipped with CCTV systems and magnifiers	3
They should have a greater selection of large-print books	2

Table 3.53

SPECIAL ITEMS AND SERVICES AT LIBRARIES

	Number of Respondents		
Do you use: (Q378)	Yes	No	Not Available
Large-type books or newspapers	5	15	1
A phonograph record section	7	14	0
Listening rooms	5	16	0
A closed circuit TV system	3	16	2

Table 3.54

JOB EXPERIENCES

Variable	Number of Respondents or Responses	Percentage
Do you think your vision is an important factor in the kinds of jobs you can find? (Q124)	n=91	
Yes		91%
No		9%
Did you ever change jobs because of changes in your vision? (Q126)	n=94	
Yes		18%
No		82%
Why did you stop working? (Q129)	n=51	
Vision		53%
Other reason		45%
Vision and other reason		2%
Is there anything special about your job that makes it a good one for you in terms of your vision? (Q116)	n=42	
Yes		69%
No		31%
What? (Q117)		
I am permitted to use visual aids	6	
There is no detailed work involved	6	
I work in a confined space and am near things that I need	3	
I work via telephone, and hence have no face-to-face contact with clients	2	
I am my own boss, and am under no time pressure	2	
I don't have to travel	2	
There are no hazardous things or places where I work	1	
I have access to braille supplies	1	
My co-workers help me	1	
Are any of your co-workers partially sighted or blind? (Q118)	n=41	
Most		7%
Some		27%
None		61%
I work alone		5%

(continued on next page)

Table 3.54--Continued

JOB EXPERIENCES

Variable	Number of Respondents or Responses	Percentage
Is there anything that you don't do or that you do differently on the job, compared with fully sighted people? (Q119)	n=41	
Yes		73%
No		27%
What? (Q120)		
I use visual aids or other special equipment	9	
I can't or don't do certain tasks	7	
I do a better job, I am more motivated	4	
I am slower	3	
Some of the standard equipment is modified for my use	3	
I travel less frequently	2	
I write larger	2	
I rely on my memory more	2	
I put up better with a poor job	1	
I attend fewer meetings	1	
Do you have any problems on the job because you are partially sighted? (Q121)	n=42	
Yes		64%
No		36%
What? (Q122)		
I am unable to see details and other small things	13	
My co-workers don't understand my handicap or take it into consideration	6	
I am bothered by my slowness	4	
Transportation is difficult for me	4	
I need special lighting	2	
I am unable to perform the same tasks as my co-workers	2	
I am unable to see (well) at a distance	1	
I (visually) miss events going on around me	1	

three-fourths said they do their job differently from fully sighted people, and nearly two-thirds said they have problems on the job because they are partially sighted. However, some of the differences cited may be advantages instead of disadvantages (e.g., I do a better job, I am more motivated"), while other differences are neutral in terms of job performance (e.g., "Some of the standard equipment is modified for my use," and "I write larger"). Similarly, only some of the on-the-job problems mentioned are directly related to job performance, while others are simply inconveniences (e.g., "Transportation is difficult for me," and "I need special lighting"). On-the-job difficulties attributed to vision bear little relationship to the six variables expected to influence VEAPs. Among them, only $acuity_m$ is significantly related to job difficulties, with those having the most severe vision reduction most frequently reporting such problems ($p = .01$).

Recognizing Familiar Faces

Recognizing familiar faces is a problem for most of our respondents (Table 3.55). As expected, the farther away the known person is, the less likely is the respondent able to recognize him or her. (While 69 percent of those responding report that they are unable to recognize a known person across the street when there is sufficient light, only 26 percent report that they are unable to do so when the familiar person is across the room.) The percentage continued to drop when we asked about recognizing a familiar person across a table--only 11 percent reported that they could not, and only 7 percent could not recognize a familiar person standing next to them. Of the 53 individuals who had difficulty recognizing familiar faces across a room or closer to them, 76 percent reported that they were bothered by their inability to recognize people in these situations.

Among the VEAPs in this group, significant findings were obtained when we asked respondents (a) whether they could recognize a familiar person across the street and (b) whether they could recognize a familiar

Table 3.55

RECOGNIZING FAMILIAR FACES

Variable	Number of Respondents	Percentage
In good weather or lighting conditions, can you recognize familiar persons in surroundings where you would normally see them? (Q53)		
Across the street?	n=92	
Yes		17%
Sometimes		14%
No		69%
Across the room?	n=93	
Yes		44%
Sometimes		30%
No		26%
Across the table?	n=94	
Yes		68%
Sometimes		21%
No		11%
Standing next to you?	n=93	
Yes		81%
Sometimes		12%
No		7%

person across a room, presuming adequate lighting and familiar surroundings in both cases. Relative to (a), persons with major acuity defects experience disproportionately frequent problems ($acuity_m$, $p < .01$). Relative to (b), the relationship of such difficulties to reduced $acuity_m$ is only approximately significant ($p = .07$). In addition, those with serious $field_m$ impairment had disproportionately frequent problems ($p > .01$). Finally, age was also a factor in this VEAP. The 45-64 age group had the most frequent difficulty, 75 percent in this category responding that recognizing a familiar person across

the room was a problem. Among the group aged 65 and older, 56 percent found such recognition to be a problem. In contrast, the majority of the youngest group (aged 21 to 44) did not find recognizing a familiar person across the room to be a problem ($p = .02$).

Using the Telephone

All but one respondent use the telephone; the one who does not said that this is because of poor vision (Table 3.56). Although most respondents do use phone booths away from home, 96 percent of those responding reported at least some difficulty with reading phone books in phone booths. With the current trend to install phones at heights convenient for persons in wheelchairs, it will be interesting to learn whether partially sighted persons will find it more difficult to use these phones (which are well below eye level).

Problems at Home

Table 3.57 contains a list of obstacles that we thought might be troublesome to partially sighted persons in their own or someone else's home. As shown, respondents experience fairly severe problems with sliding glass doors, cabinet doors and drawers left partly open, and toys and other small objects left on the floor. Table 3.58 gives respondents' methods for protecting themselves from harm at home; most of these methods involve keeping the environment orderly and predictable, but some respondents reported special visual cues they provide for their own convenience and safety at home (e.g., using drinking glasses of a high-contrast color).

Cleaning. Well over half of our respondents at least sometimes perform home cleaning tasks (Table 3.59). Domestic tasks probably fall more heavily upon the women respondents than upon the men, and this may explain in part why a large percentage of the respondents do not perform these tasks. In addition, some respondents may hire domestic helpers for reasons other than their vision, and many people today (both partially and fully sighted) do not buy clothes that require

Table 3.56

USING THE TELEPHONE

Variable	Number of Respondents or Responses	Percentage
Do you use the telephone? (Q363)	n=94	
Yes		99%
No		1%
Why not? (Q364)		
Poor vision	1	
How do you usually dial a telephone? (Q365)	n=92	
I look at the dial		36%
I use touch		38%
I use both vision and touch		23%
I ask the operator for assistance		3%
Can you use a pushbutton phone? (Q366)	n=93	
Yes		80%
No		3%
Don't know (haven't encountered a pushbutton phone)		17%
Do you use phone booths? (Q367)	n=93	
Yes		82%
No		18%
Can you read a phone book in a phone booth? (Q368)	n=72	
Easily		4%
With some difficulty		40%
Not at all		56%
Can you find the coin slot and coin return in a phone booth? (Q369)	n=76	
Easily		80%
With some difficulty		18%
With a great deal of difficulty		2%

Table 3.57

OBSTACLES IN THE HOME

Obstacle (Q233)	Number of Respondents		
	Big Problem	Small Problem	Almost No Problem
Sliding glass doors	33	22	33
Screen doors	12	29	52
Room doors left partly open	23	18	52
Cabinet doors or drawers left partly open at:			
leg level	33	25	35
waist level	24	23	46
head level	35	25	32
Toys and other small objects left on the floor	35	26	30
Furniture that has been moved to a different place	29	14	51

Table 3.58

METHODS FOR ENSURING SAFETY AT HOME

Method (Q235)	Number of Responses
I keep things neat and avoid clutter	33
I keep doors fully open or fully closed	22
I keep things in the same place	14
I keep drawers closed	7
I move furniture myself or demand to be informed when furniture has been moved	6
I wind up electrical cords and don't have wires crossing paths of travel	6
I look where I'm going and move cautiously	3
I avoid hanging things around, like suspended light fixtures or plants suspended from the ceiling	2
I avoid dark areas and use good lighting	1
I have the leading edge of risers and runners of stairs painted a color that contrasts sharply with the rest of the stairs	1
I use drinking glasses of a color that contrasts with my table and the other things on the table	1
I use unbreakable kitchen ware	1
I turn all pot handles in on the stove, so that I won't hit them and topple hot food on myself	1
I avoid using scatter rugs, because I might slip on them	1
I wipe up spillage immediately	1
I mark glass doors to make them more visible	1
I keep chairs in the proper place under the table	1
I don't leave my bed at night	1

Table 3.59

CLEANING ACTIVITIES

Do you perform this activity?	Number of Respondents	Yes	Sometimes	No
Washing pots and pans (Q242)	n=50	46%	18%	36%
Dusting, vacuuming, sweeping, mopping (Q245)	n=94	38%	21%	40%
Laundry (Q248)	n=89	50%	17%	33%
Trouble operating controls? (Q249)	n=59	20%	10%	70%
Ironing (Q250)	n-94	24%	14%	62%

ironing. Thus, we have no evidence that cleaning tasks such as washing dishes or doing laundry present very serious problems to the partially sighted; evidence to the contrary is found in the result that 70 percent of those respondents who do their own laundry have no trouble operating the controls. However, as might be expected, judging the cleanliness of carpets or floors does seem to be a fairly difficult task. Of the 49 responses relative to one or more methods of judging cleanliness, one-third of the responses indicate that guesswork is used to determine whether the floor needs cleaning (Table 3.60). (Examining the entire floor would of course present difficulties to a partially sighted person.) Cleaning up broken glass on the floor appears to be a formidable problem: of 91 respondents, 18 tend to pick up the large pieces by hand and the smaller ones by sweeping or vacuuming; 17 ask someone else to pick up the glass.

Table 3.60

METHODS FOR JUDGING CLEANLINESS OF OBJECTS

Variable	Number of Respondents or Responses	Percentage
Pots and pans (Q244)	n=66	
Vision		20%
Touch		56%
Vision and touch		23%
Carpet or floor (Q246)		
Vision	19	
Touch	12	
Smell	1	
Guess	17	

Cooking. Approximately 80 percent of our respondents cook for themselves at least occasionally, and most seem to have little or no difficulty with basic cooking tasks (Tables 3.61, 3.62, and 3.63).

Table 3.61

COOKING ACTIVITIES

Variable	Number of Respondents or Responses	Percentage
Do you cook for yourself? (Q253)	n=93	
Frequently		53%
Occasionally		27%
Rarely		11%
Never		9%
Do you have trouble adjusting the heat on the stove? (Q256)	n=73	
Yes		20%
No		80%
Do you have trouble knowing what burner is on? (Q257)	n=73	
Yes		20%
No		80%
How do you know when a burner is on? (Q258)		
I feel for the heat over the burner	25	
I feel for the position of knobs or dials	13	
I can see the coils or flame	9	
I use the electric light on the stove	5	
I listen for the burner to go on	3	
I smell for gas, to learn whether a burner is on but not lit	2	
I have installed a light on my stove	2	
Are there any cooking utensils or appliances that you find particularly helpful? (Q260)		
Crockpots and appliances with timers	12	
Deep frying pots and pans	5	
Timers and other gadgets with raised letters or numbers	4	
A set of measuring cups in different sizes	4	
Measuring cups with raised markers	4	
A microwave oven	3	
Tongs rather than a fork	2	
Oven mitts	2	
Color contrast utensils and food	2	
A screen to be placed over a frying pan	1	
Unbreakable utensils (plastic and wood)	1	
Utensils with long handles	1	
Highly visible markings for the most frequently used settings on stove and oven	1	

Table 3.62

PREPARING FOOD

To what degree are these activities a problem? (Q255)	Number of Respondents		
	Big Problem	Small Problem	Almost No Problem
Preparing foods by grating, peeling, chopping, etc.	2	13	56
Mixing things together	0	6	66
Pouring liquids	7	29	39
Turning food over in the pan	6	16	50
Knowing when things are done	8	22	42
Knowing when food is discolored	16	17	36

Table 3.63

THINGS USED IN COOKING

To what degree do the following cause trouble for you? (Q254)	Number of Respondents		
	Some Trouble	No Trouble	Cannot Use At All
Printed recipes like those in cookbooks	25	25	9
Recipes from magazines and newspapers	19	22	10
Measuring lines printed on a measuring cup	29	25	2
Temperature dial on the stove	28	38	2
Measuring spoons	10	51	0

Certain objects used in cooking, however, cause at least some trouble for more than half of the respondents who cook: lines on a measuring cup, and recipes printed in cook books, newspapers, and magazines.

Medicines and First Aid. More than 70 percent of our respondents have trouble reading labels on medicine bottles (Table 3.64). Because knowing what medicine one is taking is of critical importance, this problem should be rated as a very severe VEAP. In particular, those respondents who have the most serious $acuity_r$ impairment are especially likely to have difficulty reading instructions on medicine labels ($p = .02$). Most respondents said they determined how much medicine to take either by enlisting the help of another person or by using some visual aid.

Almost half of those responding can read a clinical thermometer with any visual aids they use. Not surprisingly, the extent to which reading a thermometer is seen as a problem is significantly related to both $acuity_r$ and $field_r$ measures; the greater the vision loss, the greater the difficulty ($p < .01$). Age is also a factor in this VEAP ($p = .06$); 75 percent of those aged 65 and older report reading a thermometer to be a problem, as contrasted with 61 percent in the 45-64 age group and 42 percent in the 21-44 age group.

We were surprised and comforted to learn that nearly three-quarters of our respondents believe they can give first aid. We had expected the removal of splinters and glass slivers to be troublesome, and we were not surprised that someone mentioned difficulty handling injuries to the feet, because the feet are too far away from the eyes to be observed clearly or conveniently by many partially sighted persons.

Using Tools. About three-fourths of our respondents use household or carpentry tools; of these, more than three-fourths use tools at least occasionally (Table 3.65). Of the 54 persons who responded to the following questions, almost all said they can use a screwdriver and a hammer and nails; over 60 percent use a saw, 35 percent use a level, and 26 percent use various power tools.

Table 3.64

MEDICINES AND FIRST AID

Variable	Number of Respondents or Responses	Percentage
Do you have any trouble reading labels on medicine bottles? (Q261)	n=92	
Yes		72%
No		28%
How do you determine how much medicine to take? (Q262)		
I ask another person to read the instructions to me	29	
I use a magnifier	25	
I use my glasses	19	
I ask the druggist to read the instructions to me	8	
I ask the doctor to give me the instructions	8	
I read instructions many times and commit them to memory	6	
I use a CCTV system	5	
I read the instructions with some difficulty	4	
The box that contains the medicine bottle has instructions printed on it in large letters	3	
I identify the medicine containers by touch	3	
I note the shape and color of the container	2	
I mark the container with braille tape	2	
I store my medications in a particular order, and I maintain that order	1	
I have color-keyed my medicine cabinet	1	
Can you read a clinical thermometer with any aids that you use? (Q275)	n=85	
Yes		45%
No		55%
How? (Q276)		
I use a magnifier	9	
I use a bright light	5	
I use my glasses	4	
I use an oversized thermometer	2	
I use a thermometer with a red liquid	1	
Can you give first aid? (Q272)	n=91	
Yes		70%
Sometimes		14%
No		16%

(continued on next page)

Table 3.64--Continued

MEDICINES AND FIRST AID

Variable	Number of Responses
How do you give first aid? (Q273)	
I use standard first aid procedures	36
I seek help from someone else	9
I use a magnifier	8
Removing glass is a problem	8
Splinters give me trouble	7
I use my glasses	6
I use a bright light	4
I keep my first aid supplies in a specified order	2
I have trouble handling injuries to my feet	1

Table 3.65

USING TOOLS

Variable	Number of Respondents or Responses	Percentage
Do you use household or carpentry tools? (Q277)	n=94	
Yes		74%
No		26%
How often? (Q278)	n=70	
Frequently		17%
Occasionally		60%
Rarely		23%
Do you ever use a hammer and nails? (Q279)	n=54	
Yes		94%
No		6%
Can you see the nail as you hammer it? (Q280)	n=50	
Yes		62%
No		38%
When you can't see the nail, how do you tell whether it is going in straight? (Q281)		
I guide it with a finger	15	
I check the direction frequently	3	
I don't concern myself with straightness of path	2	
I rely on my past experience	2	
I listen to the sound of the hammer hitting the nail	1	
I get close to the action	1	
I use nails with big heads	1	
Do you ever use a screwdriver? (Q282)	n=54	
Yes		98%
No		2%
Can you see the screw as you turn it? (Q283)	n=53	
Yes		58%
No		42%
Do you ever use a saw? (Q285)	n=54	
Yes		63%
No		37%

(continued on next page)

Table 3.65--Continued

USING TOOLS

Variable	Number of Respondents or Responses	Percentage
Can you see the saw as it cuts? (Q286)	n=34	
Yes		74%
No		26%
When you can't see it, how do you know the saw is cutting straight? (Q287)		
I make a heavy black mark on the material	4	
I leave ample margin for error	3	
I do it by touch (!)	2	
I lock the wood in a vice first	1	
I use a second piece of wood as a guide	1	
I watch the reflection of light off the saw blade	1	
Do you ever use a level?(Q288)	n=54	
Yes		35%
No		65%
Can you see the air bubble? (Q289)	n=19	
Yes		100%
Do you use power tools? (Q291)	n=54	
Yes		26%
No		74%
What tools? (Q292)		
Drill and drill press	9	
Saw	8	
Sander	3	
Soldering iron	2	
Screwdriver	1	
Do you have any difficulties using power tools? (Q293)		
I have trouble cutting a straight line	5	
I have difficulty being accurate	3	
I have trouble using a soldering iron	1	

Interestingly, it is those with least $acuity_r$ impairment who most often report that seeing a nail while hammering is a problem: 72 percent in the better $acuity_r$ category gave this response ($p = .09$). We suggest it is only those with the least acuity reduction who are likely to do a great deal of hammering and thus incur problems. Contrasting results were obtained for use of a screwdriver: 70 percent of those in the better $acuity_r$ group report little or no difficulty, while the majority of those with more severe $acuity_r$ impairment find that using a screwdriver poses visual problems ($p = .03$).

Respondents reported various methods for ensuring the straightness of a nail and a saw-cut (Table 3.65). Most of these methods involve either using nonvisual senses (including two persons who check the saw's path by touch!) or accentuating visual cues (e.g., using large-headed nails, or making a heavy mark on the material to be sawed).

Yardwork and Gardening. About 35 percent of our respondents do at least some gardening or yardwork; because some live in apartments or may not garden for nonvisual reasons, this figure does not necessarily mean that the respondents who do not garden are prevented from doing so by their visual problems. Of the 34 individuals who do garden, about half use a lawnmower (Table 3.66).

Tables 3.67 and 3.68 show how much of a problem respondents who garden regard certain tasks to be. More than half of the respondents who garden do not edge a lawn, and nearly half either do not trim hedges or bushes or find this activity to be a big problem. However, many fully sighted amateur gardeners also find lawn edging and bush trimming to be difficult tasks, so our respondents' problems may be due to factors other than their impaired vision.

Sewing. Nearly three-fourths of our respondents do not sew at all (Table 3.69). Again, we must recognize the fact that most men in our culture do not sew. All respondents who do sew said that they sew by hand, and 40 percent also use sewing machines. Threading the needle was reported as a problem by about 70 percent of those who sew, and getting seams straight is a problem for about 44 percent of those who

Table 3.66

YARDWORK AND GARDENING

Variable	Number of Respondents	Percentage
Do you do any yardwork or gardening? (Q294)	n=94	
Yes		36%
No		64%
Do you use a lawnmower? (Q295)	n=34	
Yes		47%
No		53%

Table 3.67

GARDENING PROBLEMS

	Number of Responses			
How much of a problem is: (Q297)	Big Problem	Small Problem	Almost No Problem	Doesn't Do
Weeding	5	6	19	4
Trimming bushes or hedges	5	7	11	11
Edging the lawn	1	3	11	18
Watering	2	1	30	1

Table 3.68

ADDITIONAL GARDENING PROBLEMS

What other difficulties do you have with gardening? (Q299)	Number of Responses
I have trouble telling plants from weeds, or identifying plants	7
I can't see bugs	4
I have trouble picking ripe vegetables and fruit	3
I can't see twigs or thorns	2
I have trouble planting seeds in neat rows	2
I trip over tools or fall over bushes	2
I find it hard to level the ground	2
Garden gloves interfere with my sense of touch	1
I sometimes run into fences with mower blades	1
I have trouble attaching a hose to a faucet	1

Table 3.69

SEWING

Variable	Number of Respondents or Responses	Percentage
Do you sew? (Q303)	n=94	
Yes		28%
No		72%
By hand? (Q304)	n=26	
Yes		100%
Do you have trouble threading the needle? (Q405)	n=25	
Yes		68%
No		32%
How do you thread the needle? (Q306)		
I use a wire needle threader or self-threading needles	15	
I do it by touch	3	
I obtain help from someone	3	
I use needles with large eyes	2	
I use a strong light	1	
I use my glasses	1	
Do you have trouble getting a seam straight by hand? (Q307)	n=23	
Yes		44%
No		56%
How do you get the seam straight? (Q308)		
I measure by touch or I pin and measure	12	
I accept some error	3	
I obtain help from someone	1	
I use a measuring stick	1	
Do you sew by machine? (Q309)	n=25	
Yes		40%
No		60%
Do you have trouble threading the needle? (Q310)	n=10	
Yes		70%
No		30%

(continued on next page)

Table 3.69--Continued

SEWING

Variable	Number of Respondents or Responses	Percentage
Do you have trouble guiding the material? (Q312)	n=10	
Yes		50%
No		50%
Do you use a printed pattern? (Q314)	n=24	
Yes		25%
No		75%
Can you see the lines and instructions on the pattern? (Q315)	n=6	
Yes		100%

sew by hand and for 50 percent of those who use machines. Approximately one-fourth of the persons who sew use a printed pattern, and all of these said they can see the lines and instructions on the pattern.

Matching colors. Only 12 percent of the responses indicated serious difficulty in matching colors and telling whether pieces of clothing go together (Table 3.70). Respondents reported a variety of methods for coordinating the garments they wear; some obtain help from someone else or use a system (e.g., organizing the closet by color, or pinning together garments that harmonize.

Grooming. Some 64 respondents said they are able to take care of their own toenails and fingernails, but toenails present more difficulty for our group (Table 3.71).

Almost 90 percent of the women respondents said they use cosmetics, and 42 percent of these use visual aids in applying them. When we asked female respondents whether there are any cosmetics they would like to use but do not use because of their vision, 40 percent said yes;

Table 3.70

MATCHING COLORS

Variable	Number of Respondents or Responses	Percentage
Can you match colors and tell whether pieces of clothing go together? (Q327)	n=91	
With ease		55%
With some trouble		33%
With much trouble		12%
What system do you use to help choose the right things to wear together? (Q328)		
I don't have any special system	32	
I obtain help from someone	12	
I organize my closet by color	8	
I depend upon my eyesight	6	
I use good lighting	4	
I pin or tie clothing together in color combinations	4	
I wear a "uniform"--jeans, white socks, etc.	4	
I note differences in texture of cloth and differences in shape and size of buttons	3	
I purchase clothes that will match almost anything	3	
I have problems distinguishing colors	3	
I use buttons to mark things, or I mark things	3	
I always wear the same things together	2	
Someone hangs up matching clothes together for me	2	
I have things like socks that are identical in color, to avoid trouble	1	
I use braille marking	1	

Table 3.71

GROOMING

Variable	Number of Respondents or Responses	Percentage
How do you handle taking care of your toenails and fingernails? (Q318)		
I do it by myself	58	
I do it by touch and feel	19	
I obtain help	12	
I handle my own fingers; someone helps me with my toes	11	
I do it carefully	3	
I have my fingernails manicured; I do my own toes	3	
I bite my fingernails	2	
Do you use cosmetics on your face? (Q320)	n=45	
Yes		89%
No		11%
Do you use visual aids to help with cosmetics application? (Q321)	n=40	
Yes		42%
No		58%
Are there any cosmetics you would like to use, but do not use because of your vision? (Q323)	n=45	
Yes		40%
No		60%
What cosmetics? (Q324)		
Mascara	6	
Eyeliner	5	
Eyeshadow	5	
Eye makeup	4	
Face makeup, liquid makeup	4	
Eyebrow pencil	2	
False eyelashes	1	
Do you have any difficulty taking care of your hair? (Q325)	n=45	
Yes		22%
No		78%

(continued on next page)

Table 3.71--Continued

GROOMING

Variable	Number of Respondents or Responses	Percentage
Can you think of any other things about grooming and dressing that are difficult for you? (Q329)	n=94	
Yes		56%
No		44%
I have difficulty seeing minor spots on clothes, scuff marks on shoes, and small holes	9	
I have trouble keeping my sideburns and moustache properly trimmed	7	
I have trouble telling front from back in garments	5	
I find it hard to pluck my eyebrows	4	
I have difficulty seeing runs in stockings	2	
I find it hard to use nail polish	2	
I have trouble using a mirror	2	
I have trouble weighing myself	1	

we were interested to note that nearly all the cosmetics they mentioned were types of eye makeup, which is difficult to apply when using a visual aid. Most women respondents said they have no trouble caring for their hair; those who do have trouble (10 respondents) said the trouble was in parting (4), setting (3), checking tinted hair (2), or cutting (1).

Partially sighted people have difficulty reading bathroom scales or any scales when the numbers are at foot level or waist level. At best, they can read the numbers only by using a large, heavy, or awkwardly shaped visual aid, which often forces the user to bend or turn in a manner that seriously alters the weight recorded on the scale, even after an adjustment has been made for the weight of the visual aid.

Accidents

Almost 45 percent of the respondents said they had had accidents or injuries (other than minor bumps and bruises) that they would attribute to their vision (Table 3.72). Most of the injuries were accidental, but two individuals said they had been victims of physical abuse because of their visual problems. The youngest age group (21-44) reported more accidents than did the older groups. Interestingly, women were significantly more likely than men to report accidents attributable to vision ($p = .08$).

Table 3.72

ACCIDENTS

Variable	Number of Respondents or Responses	Percentage
Have you had any accidents or injuries that you would attribute to your vision? (Q486)	n=93	
Yes		44%
No		56%
What accidents and injuries? (Q487)		
Fell (unspecified).	11	
Fell downstairs.	7	
Bicycle accident.	7	
Nearly drowned while swimming.	3	
Hit by ball.	3	
Fell while working	2	
Tripped over a fan; tripped on ice.	2	
Injured myself using tools.	2	
Victim of physical abuse.	2	
Fell over a dog.	1	
Fell as a result of trying to jump over a hedge.	1	
Burned myself.	1	
Ran into a car.	1	
Slipped on slick surface (from spillage).	1	
Had a bobsled accident.	1	
Set my hair on fire while working.	1	
Cut myself.	1	

Other Problems

When asked about the most frustrating problems that they attribute to their vision, 88 respondents mentioned the following:

- Problems with reading (37)
- Problems with transportation (22)
- Job difficulties (15)
- Recognizing people (13)
- Social acceptance (11)
- Restricted activities (10)
- Inability to see surroundings in detail (10)
- Dependence on others (10)
- Restricted personal movement (9)
- Expectations of others (8)
- Difficulties shopping (7)
- Not being able to drive (6)
- Fully sighted people's misconceptions or lack of knowledge about the partially sighted (6)
- Finding my way around, running into things (5)
- Doing close work, using tools (5)
- Coping with activities in the classroom (5)
- Lack of adequate public transportation (4)
- Restricted participation in sports (3)
- Trouble identifying objects (3)
- Writing (2)
- Finding objects and judging the location of things (2)
- Slowness (2)
- Accepting my loss of sight (2)
- Inability to see plays or movies (1)
- Difficulty going out alone at night (1)
- Inability to control my dog or children (1)
- Dating (1)
- Being taken advantage of or tormented by others (1)

- My nervousness (1)
- My tendency to get headaches or feel dizzy (1)

Most of these complaints echo the results reported earlier in this section. One response, "Expectations of others," merits some comment because respondents meant several different things by it. Some respondents said they are frustrated because people expect too much of them, others because people expect too little and underestimate their capabilities. Some said that people believe they are dishonest because they can do some things that fully sighted people think they should not be able to do, and are unable to do other things that people believe they should be able to do.

LOW-FREQUENCY PROBLEMS OF SERIOUS CONCERN

Two of the areas we explored--driving and child care--were relevant to so few respondents that the data obtained can reveal little. Because of the visual problems of our respondent population, very few of them are able to drive; in the area of child care, we discovered that the vast majority of the respondents do not have children under 13 years old; of the small number (13) with young children, only 5 are responsible for their children's care. Still, driving an automobile and taking care of young children are so basic to our society that we concluded that the reader would want to examine our respondents' comments. Because the available data are so scanty, however, the reader is admonished not to try to draw any definite conclusions beyond the fact that driving is a formidable problem for our respondents (and probably for partially sighted persons in general) and the fact that few members of our respondent population take care of small children.

Driving a Car

When asked whether they drive a car, 9 percent of those responding (89) said yes. Those who drive were asked several questions about driving in various weather conditions. Their responses are given in

Table 3.73. When asked whether they use any visual aids (including sunglasses) when they drive, seven respondents said yes and one said no. When the eight who drive were confronted with a list of potential problems that occur when driving and that might be influenced by poor vision, they responded as shown in Table 3.74.

Table 3.73

DRIVING IN VARIOUS WEATHER CONDITIONS

	Number of Respondents	
Do you drive: (Q197)	Yes	No
In the daytime	8	0
At night	3	5
At twilight	3	5
When it's rainy in the daytime	5	3
When it's rainy at night	3	5
When it's foggy	3	5
When it's windy	8	0

Table 3.74

POTENTIAL DRIVING PROBLEMS FOR
A PARTIALLY SIGHTED DRIVER

Problem (Q200)	Number of Respondents
Reading signs and signals up close	3
Reading signs and signals at a distance	5
Judging distance	2
Judging speed	0
Seeing obstacles to the side	2
Seeing obstacles at a distance	3
Reading guages while driving	4
Seeing markings on the street	0
Other:	
Seeing pedestrians, kids, jaywalkers	3
Driving in the rain	1

Child Care

Of our respondents, 15 had children under 13 years old; 13 have young children who live with them at home. When those whose children live at home were asked who was mainly responsible for the care of those children, 5 participants said that they were, 5 said their spouses were, 1 said an older child was, and 2 said an (unspecified) other was. Table 3.75 lists several child care tasks and indicates what level of problem the respondents regarded those tasks to be.

When asked to describe any childcare difficulties that they would attribute to their vision, two comments were, "I (sometimes) bump into them" and "I have difficulty reading to them."

Table 3.75

CHILD CARE TASKS

Task (Q239)	Number of Respondents		
	Big Problem	Small Problem	Almost No Problem
Preparing meals for the children	0	1	10
Keeping track of the children when they are inside the house	0	1	12
Keeping track of the children when they are playing inside their own yard	0	3	10
Keeping track of the children when they are playing outside their own yard	1	5	5
Making sure the children are clean	1	2	8
Dressing the children	1	1	9
Doing minor first aid like removing splinters *	9	2	0
Visually recognizing the children when they are among other children across the street	10	0	2
Helping the children with homework	1	3	5

*One respondent says she/he doesn't do this task.

CONCLUSIONS

The information contained in this chapter supports our initial conjecture that partially sighted persons using their residual vision are able to do many things for themselves that are beyond the capability of the functionally blind. Further, given appropriate visual aids, not only is their range of activities expanded, but they can also perform many habitual tasks more rapidly and more thoroughly. Nonetheless, several areas of endeavor pose environmental adaptation problems whose nature and severity have been explored in detail in preceding sections.

With respect to most types of VEAPs investigated, difficulties often suggested two sorts of solutions. First, there are problem areas (e.g., problems with outdoor mobility and with public transportation) in which visual aids are used with surprisingly low frequency--a reflection of the fact that clinical attention is typically focused on near vision rather than distant vision needs. Introduction of visual aids such as binoculars, monoculars, telescopic spectacles, and the like would undoubtedly help alleviate some of these important VEAPs. Second, in all types of public settings (e.g., airports, office buildings), a variety of VEAPs arise that could be ameliorated by the use of larger, better designed, and more rationally placed signs, as well as by systematic and consistent layouts and directories or floor plans. However, it is evident that the best resource our partially sighted respondents have for coping with VEAPs is their own ingenuity.

These considerations notwithstanding, there remain VEAP domains that currently resist solution. One persistent problem is adjusting to a rapid and sharp change in ambient illumination such as occurs in moving from a daylit area into a dark room or the reverse. Cafeterias and large department stores and supermarkets also pose difficulties that partially sighted persons typically cannot manage except by relying on other persons for help. Comparable problems arise when riding unfamiliar bus routes. In the main, however, improved service delivery could greatly improve the functional ability of the partially sighted.

Chapter 4

SERVICES AND ASSISTANCE TO THE PARTIALLY SIGHTED

From the last chapter we have seen that our respondents continue to face a considerable number of remediable visual-environmental barriers. We view this situation as unfortunate, given existing technology and expertise that is applicable for resolving problems of the partially sighted. However, their lack of use is not surprising in light of the fact that historically the partially sighted population has received little attention from service providers. This is not to say that our respondents have received no services, but rather that the services received were often inadequate and sometimes inappropriate, having been designed either for the fully sighted or the functionally blind.

This chapter explores the kinds of assistance received by our respondents. Section 1 examines visual aids currently in use and how they are or were employed in specific activities. Section 2 looks at the educational training respondents received; Section 3 looks at vocational and practical training; and Section 4 provides a report on organizations for the partially sighted or blind from whom our respondents sought assistance. In some cases it is difficult to determine whether the service received properly belongs in Section 2, 3, or 4. For example, organizations reported in Section 4 often provide educational and vocational services. The decision to report data in any one section is, to a certain extent, arbitrary but is based on the specific questions asked: if the questions pertain directly to basic primary, secondary, or postsecondary education, the responses appear in Section 2; if the questions pertain to vocational training, including those questions that refer to what we call "practical" training, the responses appear in Section 3; finally, if the questions pertain to organizations of or for the partially sighted or blind, the responses appear in Section 4.

SECTION 1: VISUAL AIDS

For summarizing the visual aids currently in use and how they are (or were) used by respondents, a rough classification was developed that covers any device, optical or not, portable or nonportable, that can be used as a visual aid. As such, the classification (Appendix D) includes many aids that were not mentioned by our respondents, as well as a subset of aids that have been specifically designed for partially sighted persons.

Table 4.1 maps both aids and activities in which they are used. (The general headings used in Appendix D have been modified in Table 4.1 for purposes of clarity and space.) The row headings present actual questions administered to respondents. However, since most respondents used more than one aid, tabled frequencies in the rows denote number of responses rather than respondents. For example, Questions 31 and 32 categorize aids used; under the 100 series, we note 121 instances of ordinary eye glasses or contact lenses mentioned by our 94 respondents; however, we are not reporting how many respondents use this kind of aid, but rather how many aids, in total, were cited. Similarly, 55 sunwear devices are reportedly in use (800 series); this does not mean that exactly 55 respondents use these devices, since some use more than one pair. Questions 31 and 32, then, sum all aids used by generic categories; Question 35 specifies kinds of aids used within each category. (Specific descriptions are also found in Appendix D.) Continuing down the rows, Question 80 and subsequent items refer to types of aids used for given activities. For such questions, we first determined whether or not the respondent engaged in the designated activity and, if so, whether an aid was used. This information is found under the first four column headings preceding the aids columns, where "x" is a place mark for the activity mentioned in Question 80 through Question 458.

Given 94 respondents, an average of 35 participate in each of the activities listed with the assistance of a visual aid, and an average of 19 more participate in activities without the use of any visual aid.

Table 4.1

USE OF VISUAL AIDS

Questions	Activity Participation				Visual Aids									
	Does X[a] and uses aid	Does X and does not use aid	Rarely/does not do/ does not know/NA	Missing	Ordinary eyeglasses/ Contacts 100	Nonconventional eyeglasses/contacts 200	Telescopic eyeglasses 300	Portable magnifiers 400	Binocs/monocs/ telescopes 500	Portable nonoptical devices 700	Sunwear devices 800	Semiportable magnifiers 1000	Electro/mechanical optical devices 1200	Semiportable non-optical devices 1300
Q31, 32 (a-1) Description of all aids used by each respondent	--	--	--	--	121	26	15	97	42	1	55	6	33	2
Q35 (1-9) Breakdown by specific aid codes within categories	--	--	--	--	100-1[b]	201-11	301-5	401-42	501-16	702-1	801-35	1002-1	1200-1[b]	1303-1
	--	--	--	--	101-49	206-11	302-6	402-16	502-1		803-1	1003-1	1202-32	1305-1
	--	--	--	--	102-23	207-2	303-1	403-15	509-12		804-1	1004-4		
	--	--	--	--	103-38	255-2	304-1	404-6	510-8		805-12	1005-1		
	--	--	--	--	104-1		307-2	405-2	512-2		806-2			
	--	--	--	--	151-8			406-1	515-1		808-4			
	--	--	--	--	152-1			408-1	516-2					
								413-3						
								414-3						
								415-1						
								416-1						
								419-2						
								420-3						
								422-1						
Q80 Seeing the chalkboard in a regular classroom	35	16	43	0	31		2		6				1	
Q83 Taking notes in a regular classroom	23	6	65	0	18	2		2		3			2	
Q86 Copying materials from a chalkboard in a regular classroom	14	38	42	0	13	1		2					2	
Q134 Reading	70	3	21	0	47	14	6	40	1		2	3	30	1

Q143 Writing	66	20	8	0	57	8	2	10		2	1		8	
Q163 Walking outdoors alone	70	20	4	0	66		2		16		70			
Q199 Driving a car	7	1	86	0	4		2		5					
Q252 Doing housework	53	35	6	0	51	1		6		1				
Q259 Preparing meals	70	4	19	1	29	6	1	16		2				
Q270 Administering first aid to self (other than oral Rx)	3	5	84	2	1	1							1	
Q273 Administering first aid to others	32	45	16	1	29	2		6	1				1	
Q385 Watching TV	61	26	7	0	59	1	2		6					
Q391 Watching films	28	15	40	1	32	2	2		9					
Q396 Watching theater plays	57	8	29	0	32	1	4		37		1			
Q401 Watching sporting events	34	3	57	0	19	1			22		1			
Q409 Participating in sporting events	22	48	24	1	18	2	1		2	4	4			
Q416 Doing hobbies	35	42	17	0	25	4	1	11	3				3	
Q426 Going to restaurants	71	22	1	0	58	5	3	15	3	6	3		1	
Q458 Using an airport/planes	34	6	53	1	29	1		2	7	4	2			

NOTE: No subjects used aids in the 600 and 1100 series; there is no 900 series.

[a]X = specific activity.

[b]Response was not sufficient to determine the specific aid.

Table 4.1

USE OF VISUAL AIDS

Questions	Activity Participation				Visual Aids									
	Does X[a] and uses aid	Does X and does not use aid	Rarely/does not do/ does not know/NA	Missing	Ordinary eyeglasses/ Contacts 100	Nonconventional eyeglasses/contacts 200	Telescopic eyeglasses 300	Portable magnifiers 400	Binocs/monocs/ telescopes 500	Portable nonoptical devices 700	Sunwear devices 800	Semiportable magnifiers 1000	Electro/mechanical optical devices 1200	Semiportable non-optical devices 1300
Q31, 32 (a-1) Description of all aids used by each respondent	--	--	--	--	121	26	15	97	42	1	55	6	33	2
Q35 (1-9) Breakdown by specific aid codes within categories	--	--	--	--	100-1[b]	201-11	301-5	401-42	501-16	702-1	801-35	1002-1	1200-1[b]	1303-1
	--	--	--	--	101-49	206-11	302-6	402-16	502-1		803-1	1003-1	1202-32	1305-1
	--	--	--	--	102-23	207-2	303-1	403-15	509-12		804-1	1004-4		
	--	--	--	--	103-38	255-2	304-1	404-6	510-8		805-12	1005-1		
	--	--	--	--	104-1		307-2	405-2	512-2		806-2			
	--	--	--	--	151-8			406-1	515-1		808-4			
	--	--	--	--	152-1			408-1	516-2					
								413-3						
								414-3						
								415-1						
								416-1						
								419-2						
								420-3						
								422-1						
Q80 Seeing the chalkboard in a regular classroom	35	16	43	0	31		2		6				1	
Q83 Taking notes in a regular classroom	23	6	65	0	18	2		2		3			2	
Q86 Copying materials from a chalkboard in a regular classroom	14	38	42	0	13	1		2					2	
Q134 Reading	70	3	21	0	47	14	6	40	1		2	3	30	1

Q143 Writing	66	20	8	0	57	8	2	10		2	1		8	
Q163 Walking outdoors alone	70	20	4	0	66		2		16		70			
Q199 Driving a car	7	1	86	0	4		2		5					
Q252 Doing housework	53	35	6	0	51	1		6		1				
Q259 Preparing meals	70	4	19	1	29	6	1	16		2				
Q270 Administering first aid to self (other than oral Rx)	3	5	84	2	1	1							1	
Q273 Administering first aid to others	32	45	16	1	29	2		6	1				1	
Q276 Reading a thermometer	23	15	56	0	17	1	2	10						
Q298 Gardening	15	19	60	0	16						1			
Q306 Threading a sewing needle	7	19	67	1	7									
Q308 Hand sewing straight	4	19	70	1	3		1							
Q311 Threading a sewing machine	3	7	83	1	2	1								
Q313 Machine sewing straight	3	7	83	1	2	1								
Q322 Applying makeup (women only)	17	23	5	0	5				1				12	
Q328 Choosing a wardrobe	26	68	0	0	25	1								

	Activity Participation				Visual Aids									
Questions	Does X[a] and uses aid	Does X and does not use aid	Rarely/does not do/ does not know/NA	Missing	Ordinary eyeglasses/ contacts 100	Nonconventional eyeglasses/contacts 200	Telescopic eyeglasses 300	Portable magnifiers 400	Binocs/monocs/ telescopes 500	Portable nonoptical devices 700	Sunwear devices 800	Semiportable magnifiers 1000	Electro/mechanical optical devices 1200	Semiportable non-optical devices 1300
Q335 Shopping, department/ discount stores	78	11	5	0	47	7	3	20	2	2	2			
Q346 Shopping, supermarkets	72	14	8	0	51	5	4	24	2	2	1			
Q374 Using a library	18	3	73	0	16	2	1	9		1	1		1	
Q385 Watching TV	61	26	7	0	59	1	2		6					
Q391 Watching films	28	15	40	1	32	2	2		9					
Q396 Watching theater plays	57	8	29	0	32	1	4		37		1			
Q401 Watching sporting events	34	3	57	0	19	1			22		1			
Q409 Participating in sporting events	22	48	24	1	18	2	1		2	4	4			
Q416 Doing hobbies	35	42	17	0	25	4	1	11	3				3	
Q426 Going to restaurants	71	22	1	0	58	5	3	15	3	6	3		1	
Q458 Using an airport/planes	34	6	53	1	29	1		2	7	4	2			

NOTE: No subjects used aids in the 600 and 1100 series; there is no 900 series.

[a]X = specific activity.

[b]Response was not sufficient to determine the specific aid.

Table 4.1

An average of 38 either rarely or never engage in each of the activities listed. For many of the latter respondents, not engaging in a specific activity is perhaps due to personal preference; however, it is also likely that this choice is due to not having appropriate visual aids or the aids they do have not being adequate for the activity. To clarify this question, we asked our respondents whether they did not engage in or stopped engaging in any of the activities listed because of their vision, regardless of any visual aids employed. For analysis purposes, we summed responses to all these questions to create a "visual excuse index," scoring 1 for each activity not performed strictly on account of vision. The obtained sums range from 0 to 4, where "0" means that the respondent never used his or her vision as an excuse for not doing an activity. Frequency distributions for the visual-excuse index suggest the seriousness of visual impairments; 70 percent of the respondents used a visual excuse at least once, and 40 percent used it more than once. Further analysis shows that neither sex nor age group nor the age at which respondents perceived their impairment as serious affected response frequencies.

Returning now to Table 4.1, the data partly reflect VEAPs that may very well deter activity participation and thereby affect the quality of the respondent's life, if appropriate and adequate low vision aids are not employed. (VEAPs are discussed in Chapter 3; nonparticipation in a specific activity due to vision is treated later in this chapter.) Most of the visual aids considered in Table 4.1 are or can be considered to be legitimate low vision aids. However, the question of whether a given aid should be classified as a low vision aid for partially sighted persons or rather as an "ordinary" over-the-counter or conventionally prescribed aid for fully sighted persons is often a question of functional use rather than design. For example, aids in the 400, 500, 700, 800, 1000, 1200, and 1300 series, although frequently prescribed, are nevertheless nonprescription (over-the-counter) aids that are generally available to anyone interested in purchasing them.* However, this in

*Exceptions would be, for example, binoculars or monoculars in the 500 series with prescription (Rx) in the eyepiece(s).

no way reduces the value they have for the partially sighted. In general, most fully sighted persons would have no use for aids listed in the 200 and 300 series since these aids are specifically designed for the partially sighted. The situation with aids in the 100 series is more complex. The problem is to distinguish between conventional lens prescriptions for fully sighted persons and unconventional lens prescriptions for the partially sighted. Since our interviewers were not ophthalmologists or optometrists, and were sometimes not able to determine whether ordinary appearing spectacles or contact lenses were conventional or unconventional, many aids listed in the 100 series may in fact be designed for the partially sighted.

Robert L. Gordon, O.D., low vision consultant to the Center for the Partially Sighted, has devised and suggested a set of parameters that would allow us to distinguish conventional from unconventional spectacles and contact lenses. Spectacles or contact lenses are considered to be unconventional if they satisfy one of the following seven conditions:

1. Single vision spectacles with lenses that, in absolute value, are greater than eight diopters.
2. Bifocal spectacles whose distant viewing segment, in absolute value, is greater than eight diopters, or whose distant viewing and near viewing segments differ from one another, in absolute value, by more than four diopters.
3. Multifocal spectacles with distant viewing segments that, in absolute value, are greater than eight diopters.
4. Glasses with astigmatic corrections that, in absolute value, are greater than four diopters.
5. Spectacles with prismatic correction that is greater than six diopters.
6. Occluding contact lenses; pinhole contact lenses; stenopaic slit contact lenses; cosmetic contact lenses.*

---

*To conceal scarred corneas or other ocular disfigurements.

7. Multiple pinhole spectacles; stenopaic slit spectacles; NOIR type spectacles.*

We recommend that these criteria be used to categorize lenses as conventional or unconventional in future research on the use of visual aids. In the meantime, data represented in Table 4.1 suggest the possibility of underutilization of special low vision aids for overcoming problems of the partially sighted.

Finally, let us consider use of nonvisual aids (i.e., aids such as guide dogs and white canes) appropriate for the functionally blind as well as for persons with severe visual field restrictions and for persons who, for nonvisual reasons, cannot be expected to respond rapidly enough to visual stimuli to avoid environmental hazards. The relevant questions (Q158, Q160) were asked only of respondents who "go around outdoors by [themselves], with no other person with [them]" (Q150). Of the 90 persons who do so, only 3 percent use guide dogs (for the purpose of avoiding obstacles), while 43 percent use a white cane. Of those who use a white cane, 50 percent employ it to avoid obstacles and 42 percent to indicate that they have limited eyesight. We did not inquire how our respondents acquired a white cane--whether it was on their own initiative or whether they were so advised by family, friends, medical professionals, or representatives of organizations that serve the "blind." However, the fact that such a substantial percentage use a white cane, an aid specifically designed for the functionally blind (or persons otherwise handicapped as described above) may be taken as another indicator of the lack of low vision services designed especially for the partially sighted.

---

*To protect the eye against destructive radiation (e.g., the retinitis pigmentosic eye.)

NOTE: For some patients with a nonseeing eye or an eye that is capable only of light perception or light projection, less dioptic power may be advisable in the lens that is placed before that eye since, in this case, the lens is used only for cosmetic purposes.

SECTION 2: EDUCATION

Collectively, our respondents attained an educational level well above the national norm. As of 1976, U.S. Bureau of the Census figures indicate that 64 percent of the population had achieved 4 years of high school or more, with an average of 12 years of schooling. In contrast, 81 percent of our respondents (none younger than 21 years) had completed high school or gone further: 25 percent completed high school, 20 percent completed at least one year of college, 19 percent received bachelor's degrees, 13 percent received master's degrees, and 4 percent received doctoral degrees. These percentages are all the more unusual considering the fact that our population is visually impaired.*

From our previous research with elementary-aged visually handicapped children (Bikson, Bikson, and Genensky, 1978; Bikson, Bikson, and Genensky, in process), we know that, in general, they function below normal in measured achievement and that academic success typically entails considerable work with specially trained teachers of the visually handicapped (VH teachers). In the present study, we learned that 71 percent of our respondents had attended classes for the fully sighted; among this group, 20 percent could not see what was written on the chalkboard, with or without a visual aid, from any position in the classroom (Q79). Of those who could see the board, 71 percent had difficulty copying written items (Q85). Moreover, for the large number of respondents who attended classes for the fully sighted, 76 percent believed that their vision was a limiting factor in class discussions where the use of far vision was necessary (Q87). In sum, it would appear that despite a reported level of educational attainment above national adult norms, the regular classroom setting was perceived as posing significant VEAPs for our respondents, especially when tasks involved far vision.

---

*This comparison is intended as a rough approximation only. The Census figure should be adjusted to reflect regional (especially urban-rural), ethnic, and economic differences.

We further investigated educational attainment in our sample in terms of two conditions: (1) the age at which the visual problem became serious and thus likely to affect school performance negatively, and (2) the level of visually handicapped (VH) assistance received by our respondents in terms of help from VH teachers, access to a VH resource room, or attendance at a residential school for the blind. Table 4.2 shows the type of educational experience reported by respondents who perceived their visual impairment to become serious before and after age 20 (it should be noted that these data refer only to the time at which the seriousness of the visual problem was recognized by the respondent, although actual onset may have occurred earlier). "Not applicable" indicates here that the respondent completed all of his or her schooling before the visual impairment became serious.

Table 4.2

EDUCATION AND SERIOUS VISUAL IMPAIRMENT

Age at Which the Problem Became Serious	Attended Classes for Fully Sighted Only	Received Some Special VH Assistance	Not Applicable
20 or younger	23	23	--
Over 20	3	3	36
$\overline{X}$ years of attendance:	12 years	5.5 years	

NOTE: These responses total 88. For 6 cases, information about either age of impairment or type of educational setting was not available.

The table is instructive: 41 percent of our respondents did not regard themselves as having a serious visual impairment during the years when it could have affected achievement in primary or secondary education; an additional 7 percent in the over-20 category experienced

a serious impairment while they attended school, but it is likely that they had already matriculated from high school and were in college.*

In short, fully 48 percent attended elementary and secondary schools before their visual problem became serious. Of the remaining 52 percent whose visual impairment became serious at a time when it could have adversely affected classroom performance, 23 (50 percent) of the 46 respondents received an average 5.5 years of special VH assistance; the remaining 50 percent received all of their education in classes for the fully sighted only. We now have a better perspective on the respondents who completed high school: 47 percent regarded themselves, at the time, as fully sighted and not requiring VH assistance; 24 percent had a serious visual problem and did receive VH assistance; and 24 percent had a serious visual problem and received no VH assistance. Two questions remain unanswered: first, we are unable to determine the extent or quality of VH assistance and whether it involved training in the use of residual vision to support future educational and occupational goals; second, we cannot determine the amount of variance in educational expectations and attainments accounted for strictly by visual impairment factors.

SECTION 3: OCCUPATIONAL TRAINING

We next investigated the respondents' occupational status in terms of prior vocational training and whether or not the training met their needs as visually impaired employees. We first explored occupational categories and level of income along with current age and present work status. Then, for those respondents who received training, the kind of training received is described in terms of whether it was designed for the fully sighted, the partially sighted, or the functionally blind. For purposes of this report, "occupational training" and "vocational training" are considered synonymous. By "practical training" we mean training both in general environmental

---

*This presumes, of course, that our respondents attended elementary and secondary schools from approximately age 6 through 18.

mobility and job skills not specifically designed for any given occupation. Finally, on-the-job problems of our respondents are reviewed in relation to limitations imposed by visual impairment. Tables 2.3, 2.8, and 2.9 (Chapter 2) present current age group, present employment status, and income level of respondents. These tables are instructively compared with information about respondents' employment categories and with vocational and practical training received (Tables 4.3-4.5).

As these tables indicate, our average respondent, regardless of sex, is a high school graduate or better, 47 years of age, working part time with a current household income level of less than $10,000. As we consider the question of vocational and practical training received, it is important to note that for some employment categories cited by respondents, vocational or skill training is not traditionally offered. For example, 48 percent of our respondents reported that their current (or previous) occupation is (was) in professional/technical or managerial/administrative areas, so it is likely that their basic educational experience rather than vocational training prepared them for these jobs. It should also be noted that men were significantly more likely to have received training than women.

For those who received vocational training, Table 4.4 indicates whether the training was oriented toward the fully sighted, the partially sighted, or the functionally blind. Similar data are presented for practical training, which is divided into the two types described above (general mobility and job skills).

Respondents were asked to list all fields or activities for which they had received vocational or practical training. The frequencies reported in Table 4.5 indicate responses rather than respondents, since most respondents received training in more than one area; again, training is distinguished by its orientation toward functional sight or blindness.

The data collected are insufficient to determine whether or not the training received was adequate to meet actual or desired occupational goals. However, we asked a series of questions that pertained to on-the-job problems due to visual impairment. Those currently

Table 4.3

EMPLOYMENT CATEGORIES[a]

U.S. Census Codes	Category	Frequency	Percentage
	Industry (Q111a)		
1-399	Manufacturing	12	14
400-499	Transportation, communications, and other public utilities	2	2
500-599	Wholesale trade	3	4
600-699	Retail trade	8	10
700-799	Business and repair services	17	20
800-899	Entertainment and recreation	30	36
900-999	Public administration	12	14
		n = 84[b]	
	Occupation (Q111b)		
1-199	Professional and technical	29	35
200-259	Managers and administrators, except farm	11	13
260-299	Sales workers	3	4
300-399	Clerical	15	18
400-599	Craftsmen	2	2
600-699	Operatives, except transport	5	6
700-739	Transport equipment operatives	3	4
900-979	Service workers, except private household	12	15
980-999	Private household workers	2	2
		n = 82[c]	

[a]This table presents percentages and frequencies of industry and occupation categories descriptive of respondents' jobs, including the relevant codes employed by U.S. Census reports. Responses refer either to present occupation, or, if not working, to the respondent's last employment.

[b]Ten are missing or unclassified.

[c]Twelve are missing or unclassified.

Table 4.4

VOCATIONAL AND PRACTICAL TRAINING

	Fully Sighted		Partially Sighted		Functionally Blind	
Training and Job Skills	%	Freq	%	Freq	%	Freq
Vocational training (Q69/102/104)	35	33	21	20	10	9
Practical training for the partially sighted or blind (Q96/98)	--	--	22	21	33	31
Analysis of job skills for the partially sighted or blind (Q106/107)	--	--	31	29	5	5

Table 4.5

VOCATIONAL AND PRACTICAL TRAINING FOR THE FULLY SIGHTED, THE PARTIALLY SIGHTED, AND THE FUNCTIONALLY BLIND

Fully Sighted		Partially Sighted		Functionally Blind	
Vocational Training					
Type of Work	Freq	Type of Work	Freq	Type of Work	Freq
Business/office work	16	Computer programming	5	Clerical	4
Nursing/health	5	Vending stand operation	4	Braille	1
Building trades/crafts	6	Clerical	3	Sheltered workshop	1
Beautician/cosmetology	2	Small appliance repair	2	Other	3
Engineering/drafting	3	Rug weaving	1		
Home economics	1	CCTVs	1		
Computer programming	1	Visual aids (unspecified)	1		
Minor crafts	2	Other	7		
Practical Training					
		Mobility	10	Braille	40[a]
		Household management/cooking	7	Mobility, white cane only	38[a]
		Low-vision aids	6	Mobility (unspecified)	15
		CCTVs	5	Guide dogs	3
		How to live	2	Household management/cooking	6
				How to live	4
				Personal care/grooming	1

NOTE: Of the 33 respondents who participated in one or more training programs for the fully sighted, 61 percent received a certificate or diploma.

[a]Frequencies here exceed those listed in Table 4.4 (n = 31); we believe these two discrepancies are accounted for by respondents' not regarding braille or cane instruction as instances of practical or vocational training when asked about the latter.

employed (n = 42) were asked whether there was anything they either do not do on the job or do differently compared with a fully sighted person on the same job; 73 percent responded "yes." For those currently employed, 64 percent indicated that they had problems on the job due to their vision. The job differences and problems reported are shown in Table 3.54 (Chapter 3).

From these data we learned that a significant majority of those currently employed either have on-the-job difficulties due to reduced vision or else perform their jobs differently from their coworkers in an attempt to overcome their impairment. Moreover, when we inquired of all our respondents whether they felt that their vision is (was) an important factor in the kinds of jobs they could find (or found), fully 91 percent responded in the affirmative (Q124). Yet when we asked whether they ever had to change jobs due to a change in their vision (Q126), only 18 percent responded affirmatively. This low percentage is susceptible to several interpretations. It may mean that little visual change occurs after onset of impairment and/or that after a job has been well learned, performance is not much affected by visual change. On the other hand, it may indicate that there is very little opportunity for job mobility among the partially sighted. These questions about employment mobility among the visually impaired merit further investigation. Finally, for those respondents currently unemployed (n = 52), 55 percent reported (Q129) that they stopped working because of their vision (including 2 percent who indicated that there were other reasons as well). Thus vision affects job loss more often than job change.

SECTION 4: ORGANIZATIONS FOR THE PARTIALLY SIGHTED OR THE FUNCTIONALLY BLIND

Organizational help was the last sort of assistance investigated. As indicated by the list in Table 4.6, 86 percent of our respondents had some "contact" with at least one of almost 50 organizations serving the needs of the partially sighted or the functionally blind (Q91).

Table 4.6

ORGANIZATIONS FOR THE PARTIALLY SIGHTED OR THE FUNCTIONALLY BLIND MENTIONED BY PROJECT RESPONDENTS

Organization	Frequency
Local/State	
Blind Club of San Fernando Valley	1
Credit for People with Disability	1
Low Vision Institute	1
Optometric Center	1
Retinitis Pigmentosa Foundation (RP)	7
State Clearinghouse in Sacramento	1
State Department of Rehabilitation, Vocational Rehabilitation	24
University Women's Club (Braille Section)	1
Volunteers of Vacaville	2
West Valley Occupational Center	1
National/Out of State	
American Council for the Blind	1
American Foundation for the Blind	4
Arkansas Enterprise for the Blind	1
Bureau of Blind Service	1
Catholic Guild for all the Blind	1
Foundation for the Junior Blind	12
Jewish Aid for the Visually Handicapped	1
Jewish Guild for the Blind	1
Lighthouse	2
National Aid to the Visually Handicapped	1
National Association for the Partially Sighted	1
National Association for the Visually Handicapped	3
National Federation for the Blind	12
Society for the Blind	1
Schools	
Out-of-State School for the Blind	3
Sophia Myers School, Van Nuys School	6

NOTE: While most of the organizations named are known to project staff, several are not. Among the latter, names may be incorrect and/or may refer to organizations either currently nonexistent or known by another name.

Table 4.6--continued

Organization	Frequency
Reading/Braille Oriented	
American Printing House for the Blind	2
Assemblies of God, Library for the Blind	1
Braille Book Bank	1
Braille Institute, Talking Books	62
California State Library (Home Instruction on Braille)	1
Jewish Braille	1
Library of Congress Talking Books	2
Los Angeles Braille	1
Radio Talking Book Network	1
Recordings for the Blind	6
Physically Handicapped Oriented	
ACLU Committee for the Physically Handicapped	1
California Association for the Physically Handicapped	1
County Commission for the Physically Handicapped	1
Special Purpose Organizations for the Blind	
Active Blind	1
American Association of Workers for the Blind	1
American Blind Bowling Association	3
Blind Enterprise Program	1
Blind Veterans Association	4
California Blind Businessmen, Inc.	2
National Association of Blind Students	1
Science for the Blind	1
Sounds of Music for Blind	1
VIP, Foundation for the Junior Blind	1
Other Responses	
Not an Organization	4
Organization Not Related to Vision	4
Uncodable Response	3

By "contact" we mean asking for information, going to meetings or classes, or using other services provided by the organization. In fact, many of our respondents had contact with more than 1 organization (see Table 4.6). The data collection instrument allowed respondents to list as many as 9 different organizations: 78 persons had contact with at least 1 organization, 54 had contact with at least 2, 29 had contact with 3, 17 with 4, 8 with 5, and 12 with 6 or more. At the very least, it seems clear that respondents actively sought assistance from a wide variety of organizations. In this section we first tabulate frequency of contact with various organizations. Then we present information concerning whether the organizations contacted were "very helpful," "somewhat helpful," or "not very helpful" (Q94). Finally, we consider open-ended responses that were clearly evaluative, specifying reasons why respondents rated the organizations as they did (Table 4.7).

Of the responses tabulated (n = 198), 43 percent indicated contact with two organizations: the Braille Institute (via its Talking Books program) and the California State Department of Rehabilitation. Of these responses (n = 86), 72 percent either contacted the Talking Books Division of the Braille Institute or in fact used the books--a service originally designed for the legally blind and oriented toward persons who would not be able to read ink-printed material even with the help of visual aids. That is to say, the most frequently mentioned organization contacted (n = 62) provides a service designed for persons who are assumed to have no useful residual vision and <u>not</u> designed for the partially sighted.

Contacting an organization is one matter; to determine how helpful the information or service was is quite another. We asked all respondents to evaluate the information or service received in terms of how helpful it had been in meeting their needs. Of the 78 respondents who in fact made evaluative judgments about contacts, 50 percent reported that the contact was "very helpful," 29 percent said it was "somewhat helpful," and 15 percent said it was "not very helpful." (The remaining

Table 4.7

JUDGMENT ABOUT INFORMATION OR SERVICE RECEIVED (Q95)

Response	Frequency
Positive Responses	
The social program of the organization was very useful: changed life, opened doors, helped to adjust or to function, stopped depression	57
Suggested or provided useful visual aids	20
Provided effective vocational counseling	7
Provided good counselor (unspecified)	5
Provided useful information on available sources of help	5
The organization was professional, knowledgeable	6
Negative Responses	
The social program of the organization was minimally useful: not very interesting, few activities, not many good people, just a place to go to get out of the house	15
Suggested or provided inappropriate aids	13
Education or classes provided were poor, crowded, inappropriate	5
Provided poor, inappropriate, or ineffective counseling	5
Staff of the organization had a poor attitude, the organization was not well run, was wasteful	7
Did not provide useful information on available sources of help	1
Organization did not provide good services	2

6 percent gave other responses not codable in these terms.) Even when we consider the 50 percent of responses in the "very helpful" category, a significant proportion was for services designed for the legally blind. However helpful such services may be for the partially sighted, the fact remains that these services do not focus on the training and use of residual vision. This is another outcome of the historical lack of services tailored for partially sighted persons.

Finally, after respondents judged the information or service received in terms of how helpful it was for their needs, we asked them to give reasons for their judgment. Many of the reasons provided

were descriptive rather than evaluative. Table 4.7 presents those responses that were clearly either positive or negative concerning the service received.

As Table 4.7 shows, the majority of evaluative responses were positive. Fully 68 percent (n = 57) of all open-ended responses reflect the respondents' view that the social program (provided by some organization) was either very useful or somewhat useful. Many of the reasons cited suggest a strong, positive impact on the respondents. Again, we cannot comment on whether or not a specific social program, for example, was helpful to the respondent in terms of adjusting to the life of a partially sighted person or adjusting to the life of a "blind" person. The point is that no matter how highly a respondent rated a service provided, if the service does not promote the training and use of residual vision, then we would question whether that service is adequate for a partially sighted person. These issues are further discussed in relation to the adoption of a "blind" or "sighted" lifestyle in Chapter 5.

CONCLUSIONS

To summarize the findings of this chapter, it is clear that:

- Virtually all of our respondents use some visual aid(s), although the majority of aids they use have probably been designed for use by the fully sighted. In part, this reflects the relatively low cost of ordinary visual aids (compared with the cost of more sophisticated low vision aids) as well as the availability and versatility of conventional glasses, contact lenses, binoculars, monoculars, and sunglasses. However, these findings also suggest the merit of expanding the range of use of available low vision aids specially designed for overcoming the VEAPs confronted by our respondents.

- Regarding education, visual impairment is definitely perceived as a limitation--perhaps most importantly in relation to the pursuit of advanced degrees. As we have noted, this outcome suggests the preventive role to be played in VH education for the partially sighted. We should underscore the need for effective visual aids early in the educational experience. Problems encountered in elementary school classroom settings may well have unduly limited the educational aims of the respondents.

- In relation to occupational training, what is clearly warranted is specialized training for partially sighted persons who intend to pursue professional careers. Existing occupational programs for the visually impaired need to be assessed in terms of whether these programs enhance the use of residual vision employing the existing technology of low vision aids and whether they are directed to occupational areas outside the skill and craft domain.

- Finally, we find that partially sighted persons will avail themselves of and are generally grateful for any information or assistance received from organizations intended to help the severely visually impaired. Our concern is that these organizations frequently do not provide direction and counseling especially tailored to the needs of the partially sighted.

Chapter 5

PARTICIPANT CHARACTERISTICS RELATED TO ACTIVITY LEVEL AND ORIENTATION TOWARD A BLIND LIFE-STYLE

Why do some partially sighted people seem more like blind people, while others seem more like the fully sighted? This chapter examines two aspects of this question. The first is the differences in levels and types of activity participants reported; the second is the degree of identification with a lifestyle emphasizing blindness. Using regression techniques, we examined the relative importance of degree of visual impairment, demographic characteristics, and vision-related rehabilitation training factors associated with reported activity levels and orientation toward a blind lifestyle. We first define the measures of variables employed, then explain the choice of models, and finally describe the results. Again, the limitations of the sample on which these analyses are based must be mentioned. The small number of cases limits the complexity of the relationships that can be explored, and its nonrepresentativeness limits the generalizability of results. However, the conclusions reached are valid for this sample and suggest relationships that can serve as a starting point for other research efforts.

ANALYSIS OF ACTIVITY LEVELS

Level of activity, while it has an intuitive meaning, eludes an easy operational definition. An overall activity measure would be desirable, but no one measure that sums across a heterogeneous set of activities seems satisfactory. Trimming a fingernail and driving a car are unrelated undertakings, requiring different skills and implying different kinds of competence. Simply adding them together as a measure of activity would be uninformative, and since it is difficult to quantify their relative importance, no basis exists for assigning weights to them.

We attacked this problem by creating different measures of activity. In each measure (or scale), capabilities for doing each of a set of related activities are added together to form a summary measure for an activity class. This procedure resulted in five scales, with six to ten items combined to form each scale measure. For each item included in a scale, the participant provided information during the interview about whether or not that activity was performed unaided by others. Our interest was in the ability to do things independently. Each item was recoded dichotomously (1 = does do the activity and 0 = does not do the activity) to eliminate differences among response categories used in the original items. Since missing data appeared to be infrequent and well distributed, missing items were coded as zeros so that any bias in scale values would be conservative. A score for each participant on each scale was computed by adding the values for each item in the scale, dividing by the number of items, and multiplying by 100. Thus, each scale value could range between 0 and 100 and the scales were comparable with each other.

Scales were created for classes of activities related to personal care, information, transportation, home tasks, and public access. Each scale is described briefly below. The items included in the scales are shown in Table 5.1.

- Personal Care. This scale is designed to measure ability to handle private chores without aid. These tasks include reading handwritten materials, handling money and a checking account, placing telephone calls, choosing clothing, caring for fingernails, and cutting food on a plate.
- Information. This scale is designed to measure ability to keep up with public events and personal interests without special materials such as large-print books or talking books. The following items are included: reading ink-printed materials; using the library; watching TV; and going to movies, plays, and sports events.
- Transportation. This measures the use of six modes of transportation, including walking in unfamiliar areas; taking the bus;

Table 5.1

VARIABLES INCLUDED IN ACTIVITY SCALES

	Activity Scale	Question Number	Variable	Reliability of Scale
1.	Personal care	135i	Read handwriting	.79
		318	Trim fingernails	
		327	Choose clothing	
		352	Handle money	
		358	Have checking account	
		363	Use telephone	
		430	Cut own food	
2.	Information	130	Read ink-printed material	.93
		373	Use library	
		381	Watch television	
		389	Go to movies	
		394	Go to plays, theater	
		399	Go to sports events	
3.	Transportation	151	Walk in unfamiliar areas	.92
		176	Take public bus	
		196	Drive a car	
		201	Ride a bicycle	
		360	Ride in taxi	
		456	Ride in airplane	
4.	Home tasks	245	Do house cleaning	.93
		248	Do laundry	
		253	Do cooking	
		272	Give simple first aid	
		277	Use hand tools	
		294	Work in garden	
		303	Sew	
5.	Public access	206	Go to strange buildings	.74
		211	Ask strangers for directions	
		219	Use elevator	
		226	Use public restroom	
		334	Shop in department stores	
		344	Shop in grocery stores	
		367	Use public telephones	
		429	Go to restaurants	
		441	Go to cafeterias	
		451	Stay in hotels	

driving a car; riding a bicycle; and taking taxis and airplanes.

- o Home Tasks. This scale includes tasks in and around the home such as cooking, housecleaning, sewing, laundry, using hand tools, caring for the yard, and giving first aid.
- o Public Access. This includes items related to functioning alone in public. The items are going to strange buildings; asking for directions; using elevators, public restrooms, and public telephones; shopping in grocery and department stores; and going to cafeterias, restaurants, and hotels.

Clearly, this entire set of activities was susceptible to multiple classifications.* The grouping presented here reflects our judgment about the likely interrelationships between different kinds of activities. The reliability of the scales, using Chronbach's alpha as a measure, is encouraging (Chronbach, 1951). Obtained values range from .74 to .93, which is acceptable for scales with fewer than eight items. This means that at most about 25 percent of the variance in each scale is uncorrelated and that the items in each scale do appear to be strongly related to each other.

The five scale scores are used as dependent variables in the activity level models. Using a set of independent variables, the model predicts the scores on activity-level scales. The choice of independent variables is discussed below.

---

*A principal components analysis of all the variables included in the activity scales was carried out to test for other groupings of variables. It revealed one common component of moderate strength (28 percent of the variance) and two minor components (11 and 9 percent of the variance). Based on comparison of correlations of items loading strongly on the factors with other variables, Factor 1 appears to be associated with age, Factor 2 is unclear, and Factor 3 seems associated with sex. Since these factors were so weak, grouping variables along these dimensions seemed less useful than the proposed grouping.

Visual Condition

Since vision is the primary impairment for the participants in this study, the degree of visual impairment is an obvious candidate for explaining levels of activity. From examining the six measures of vision for acuity, field, and overall visual capability for reading and for mobility (described in Appendix C) in relation to the values for the five activity scales, it was apparent that only the information scale was strongly correlated with each of the six vision codes. Leaving the moderately serious vision code category (the middle category) out of the equations, a model was estimated for each of the six measures with the four remaining categories (extremely serious, very serious, some problem, and minor problem) entered as dummy variables regressed on the information scale. The strongest relationship was found for reading acuity, which essentially took the form of a dichotomous variable. That is, the negative effects of seriousness of visual condition were very small for the least serious categories, and strong for the most serious categories. Neither acuity_m nor the field variables showed such strong, consistent relationships. Based on these results, the two most serious categories of the reading acuity measure (extremely serious and very serious) were coded into a positive value for a new dummy variable "VPSER." Only this variable was entered into subsequent models to represent seriousness of visual limitation in the study of determinants of activity level.

Another component of visual impairment is the recency of onset of the impairment. People who have recently become partially sighted are expected to be less active than those who have had more time to adjust to reduced vision and to learn new techniques for performing old tasks. Again, a regression model was estimated to establish the nature of this relationship. This model took the form:

$$\text{ACTIVITY SCALE} = f(\text{YEARS PARTIALLY SIGHTED}) + \text{ERROR}$$

It revealed a strong negative effect on activity only for those who had most recently become partially sighted. Based on this, a new dummy variable, "NEWPS," was created, which took a positive value only for those participants who had had serious visual conditions for five years or less.

The creation of these two dummy variables for seriousness of condition (VPSER) and recency of condition (NEWPS) raised the possibility of an interaction effect--that having had a serious visual impairment for less than five years might be even more of a handicap than would be implied by a simple additive measure of these effects. We tested for the presence and significance of this interaction by regressing the two visual condition variables on the five activity scales and using an F-test to evaluate the significance of change in R^2. (R^2 is the amount of variance in the dependent variable explained by the independent variables.) No significant interaction effect was found for the personal care or home tasks scales (scales 1 and 4); however, the information and transportation scales (scales 2 and 3) showed an interaction effect that was significant at the $\alpha = .05$ confidence level, while the public access scale (scale 5) revealed an interaction effect significant at the .01 level. Based on these results in a simple model, the interaction variable, representing seriousness and recency of impairment together, was included in the subsequent analysis. Thus, visual condition was represented by three predictor variables, VPSER, NEWPS, and their interaction, NEWSER.

Demographic Variables

From our informal observation of participants, we hypothesized that demographic factors such as age, sex, ethnicity, education, and income might be associated with activity levels independently of vision. Because of the small number of nonwhites in the sample, the variable of ethnicity was omitted from the analysis. Variables for age and education were transformed using procedures much like those used for seriousness and recency of visual problem. They are described below. Age,

which appeared to be associated with lower levels of activity, was recoded into five dummy variables (less than 55, 55-59, 60-64, 65-70, and over 70). Its relation to the scales when they were regressed on the age variables again was close to dichotomous, and the variable "OLDAGE" was created, which takes a positive value for participants aged 65 or over.

Next, sex was included in the model, with the dummy variable "FEMALE" receiving a positive value when the participant was female. Female participants appeared to be somewhat less active than males. Education was recoded into dummy variables representing grammar school, high school, college, and graduate school education. These variables (with high school omitted) were regressed on the information scale. Based on the regression results, the dummy variable "COLGRAD" was created, which is positive for participants who had completed college or graduate school. Better educated participants seemed to be more active.

Because annual household income was collected only as a categorical variable with categories of less than $10,000, $10,000 to $20,000, and over $20,000, a variable "LOWINC" was created, which was positive if total household annual income was reported as less than $10,000. It appeared that it was more difficult for less wealthy participants to remain active. In sum, demographic data were represented by four dichotomous variables: OLDAGE, FEMALE, COLGRAD, and LOWINC.

Rehabilitation Training Variables

Many partially sighted people receive some form of rehabilitation training designed to teach useful techniques for coping with everyday-life demands. Some obtain such rehabilitation training through organizations that do not distinguish between blind and partially sighted people. This often means that the training fails to build on remaining vision and maximize its usefulness, but instead teaches skills that do not require or utilize residual vision. Rehabilitation training designed for the partially sighted, on the other hand, usually begins

with residual vision and teaches people how to use it to best advantage. While there is considerable overlap between rehabilitation training approaches and some confusion probably exists in participants' minds about what kinds of training they received, we wanted, if possible, to explore the effects of different kinds of rehabilitation training. Accordingly, dummy variables were created. "PSTRN" was assigned a value of 1 when the participant reported having received rehabilitation training for the partially sighted and "BLNDTRN" had a value of 1 when the participant reported having received training for the blind. Some participants had received both types of training. Rehabilitation training, then, was represented by two variables, PSTRN and BLNDTRN.

Specifying the Models

Because the number of cases is too small to support finely detailed variables, the model uses dummy variables that were operationally defined to illustrate maximum effects. This allowed inclusion of all the types of variables expected to have important effects on activity levels. A complete list of independent variables, with hypothesized effects, is provided below.*

---

*Other variables which were hypothesized to have less association with activity were tested and found to have little or no association. These variables included expectation that prognosis for vision was poor, having a hereditary condition, having other blind or partially sighted family members, and feeling that the visual condition caused the participant to have a different appearance from normally sighted people.

Variable Type	Variable Name	Description	Hypothesized Effect on Activity Level
Vision	VPSER	Very poor reading acuity	Decrease
	NEWPS	Partially sighted 5 years or less	Decrease
	NEWSER	Poor acuity and recent onset of problem	Decrease
Demographic	COLGRAD	College graduate	Increase
	OLDAGE	Age 65 or over	Decrease
	FEMALE	Female participant	Decrease
	LOWINC	Income less than $10,000	Decrease
Rehabilitation training	PSTRN	Training for partially sighted	Increase
	BLNDTRN	Training for blind	Not predicted

The regression equation used to test the models took the following form:

$$\text{ACTIVITY SCALE} = f\left(\text{VISION VARIABLES} + \text{DEMOGRAPHIC VARIABLES} + \text{REHABILITATION TRAINING VARIABLES}\right) + \text{ERROR}$$

Since we were interested in specifying the effects of independent variables and comparing their impact on different kinds of activities, we regressed all the independent variables in stepwise fashion on each scale. The independent variables were entered in three steps. Vision variables were entered in step one, demographic variables in step two, and rehabilitation training variables in step three. This allowed the vision variables, over which the participant has least control, to explain as much of the variance in levels of activities as possible. The demographic variables were entered next because they were also largely predetermined for our adult sample. That is, age and sex are wholly predetermined, but income and education remain subject to some control by the participant. Rehabilitation training variables, potentially the easiest for participants to influence, were entered last so that the effects of all other variables would be controlled. The complete results are shown in Table 5.2.

Table 5.2

REGRESSION OF VISION, DEMOGRAPHIC, AND VISION TRAINING VARIABLES ON ACTIVITY SCALES

Item	Independent Variable	Dependent Variable Scale: Personal Care	Information	Transportation	Home Tasks	Public Access
Unstandardized regression coefficient	VPSER	-11.39*	-18.74*	3.05	-11.38	4.27
	NEWPS	- 9.41	- 2.10	0.42	-14.24*	- 2.31
	NEWSER	2.98	-15.14	-10.88	10.95	-16.23
	COLGRAD	5.51	11.46*	4.19	7.09	10.26*
	OLDAGE	- 7.83	-10.15*	-18.45*	- 5.84	-22.19*
	FEMALE	- 0.55	- 0.31	- 1.54	21.42*	- 7.07
	LOWINC	- 0.91	- 4.45	- 0.02	- 0.04	9.26*
	PSTRN	- 0.65	8.24	- 0.43	0.30	- 0.79
	BLNDTRN	- 1.98	5.41	1.22	7.50	3.84
	CONSTANT	75.14	57.38	53.84	44.49	63.09
Standard error	VPSER	4.98	5.22	5.75	6.69	5.82
	NEWPS	5.19	5.43	5.99	6.97	6.06
	NEWSER	8.59	8.99	9.91	11.53	10.02
	COLGRAD	3.77	3.94	4.35	5.06	4.40
	OLDAGE	4.67	4.88	5.39	6.27	5.45
	FEMALE	3.43	3.59	3.96	4.61	4.00
	LOWINC	3.41	3.57	3.93	4.57	3.98
	PSTRN	4.24	4.43	4.89	5.69	4.95
	BLNDTRN	3.68	3.85	4.25	4.94	4.30
Standardized regression coefficient	VPSER	- 0.30	- 0.36	0.07	- 0.21	0.09
	NEWPS	- 0.24	- 0.03	0.01	- 0.26	- 0.05
	NEWSER	0.06	- 0.22	- 0.20	0.16	- 0.26
	COLGRAD	0.16	0.24	0.11	0.14	0.23
	OLDAGE	- 0.17	- 0.17	- 0.37	- 0.09	- 0.40
	FEMALE	- 0.02	- 0.01	- 0.03	0.44	- 0.16
	LOWINC	- 0.03	- 0.09	- 0.00	- 0.00	0.21
	PSTRN	- 0.02	0.15	- 0.01	0.01	- 0.01
	BLNDTRN	- 0.05	0.10	0.03	0.14	0.08
Multiple R_2		0.52	0.74	0.47	0.57	0.61
Adjusted R^2		0.19	0.51	0.13	0.26	0.38

NOTE: * indicates significance at $\alpha = .05$ level.

The multiple R for the equations ranges from .47 to .74, indicating that the variables in the equations are accounting for about a fourth to a half of the variance in the activity scales. The information, public access, and home tasks scales are explained best by the variables in the equation. Personal care and transportation scales are least well explained. These conclusions are underscored by the more conservative adjusted R^2 measures, which take into account the number of variables in the equation as well as the explained variance (Theil, 1971). (The adjusted R^2 measures indicate that independent variables explain only 13 to 51 percent of the variance in dependent variable scales.) Significant values of R^2 do not mean that the independent variables such as seriousness of visual condition, age, education, or training cause the level of activity we observe. Rather, these characteristics are predictively associated with certain levels of activity. For example, while we cannot say that being a college graduate causes increased levels of activity, we can say that partially sighted people who have graduated from college tend to be more active in general than those who have not. Knowing whether or not a participant was a college graduate would allow a more accurate prediction of overall level of activity than could be made without that knowledge. The overall ratios of explained variance (by the visual condition, demographic, and training variables) to unexplained variance (by variables not included in the equation) reaches significance (using an F-test at $\alpha = .05$) for all the equations, indicating that the independent variables, taken together, are significantly associated with observed activity levels. As an aid in interpreting results, it should be noted that the unstandardized regression coefficient is the percentage of change in the activity scale value which is associated with a positive value for an independent variable. For example, if VPSER = 1 (visual condition is very serious), the personal care activity scale score is decreased by about 11 percent, holding all other factors constant.

Visual Condition Factors

Even when other factors are held constant, visual impairment condition is strongly associated with activity levels. The seriousness of the visual impairment is significantly negatively associated with the personal care and information scales. Recency of visual loss is significantly negatively associated with the home tasks activity scale.

While the inclusion of the interaction term NEWSER for people whose visual problem is both serious and of recent onset alters the stability of the signs of individual coefficients, the overall effect of serious and recent visually impairing conditions is always negative. This can be seen by summing the coefficients for seriousness (VPSER plus NEWSER) or short duration (NEWPS plus NEWSER) or by examining the correlations between independent variables and the scales as shown in Table 5.3. While it never reaches significance when all the other factors are controlled, the extra negative effect of having a serious visual condition that is also of recent onset appears large for the information, transportation, and public access activity levels. Interestingly, the effect is positive for the home tasks scale, indicating that while recency and seriousness of visual impairment taken separately reduce home task activities, their joint effect is just the opposite -- to increase home task activities. Because serious conditions of recent onset appear to decrease transportation and public access activities (which emphasize activities outside the home), they may also be associated with increased emphasis on home-based activities, although the data bearing on this point never reach statistical significance.

Demographic Factors

Being a college graduate is always associated with increased levels of activity, significantly so for information and public access activities. Some participants earned a college degree before the onset of their visual problem. For them, higher levels of activity may be associated with wider interests that lead to increased activities. Others

Table 5.3

CORRELATIONS OF VISION, DEMOGRAPHIC, AND VISUAL TRAINING VARIABLES WITH ACTIVITY SCALES

	Activity Scale				
Independent Variable	Personal Care	Information	Transportation	Home Tasks	Public Access
VPSER	-.40	-.60	-.17	-.21	-.22
NEWPS	-.33	-.37	-.17	-.30	-.27
NEWSER	-.35	-.57	-.29	-.22	-.37
COLGRAD	.21	.29	.11	.08	.19
OLDAGE	-.28	-.41	-.43	-.22	-.45
FEMALE	-.01	-.04	.01	.44	-.12
LOWINC	-.09	-.17	.03	.06	.15
PSTRN	.03	.23	.06	-.03	.14
BLNDTRN	-.06	.10	.04	.15	.07

earned their degrees after the onset of their visual problem and for them, earning a degree is really another measure of activity. (This probably accounts for the significance of the association between education and information activities that include skills needed for school attendance.) Since the association between being a college graduate and increased activity levels is always positive even when age is controlled, it is possible that the positive effect of education on activity appears both as a result of widened interests and as an additional measure of activity.

Age exhibits an equally stable relationship to activity. Participants aged 65 or over were always less active, and were significantly less active in information, transportation, and public access activities. This negative effect of age on scale value is smaller for personal care and home tasks. One aspect of this association is perhaps that participants over 65 were less likely to leave their homes alone. This may, in fact, be a less limiting factor than it appears to be for those who

are frequently accompanied by active spouses or others; the observed negative effect is on activities conducted independently, which are the ones included in the scale values.

The effect of sex, measured as the effect of being female, generally appears to be very slightly negative, a result that never reaches significance. On the other hand, being female has a large and significant positive effect on the home tasks scale. Not surprisingly, when all other variables are controlled, women are much more likely to be active in the home than men. Although this is not a statistically significant difference, the largest negative effect of being female is seen in the public access scale, which is composed of activities conducted exclusively away from home. In general, partially sighted women are more likely to be active at home and somewhat less likely to be active outside the home than are their male counterparts.

The effect of income is more difficult to interpret. Generally, when all other factors are controlled for, low household income has a small, negative effect on activity level. It is interesting to note that this negative effect is larger and frequently significant when education is not included in the model, indicating that much of the observed effect of income is through its correlation with education. Low income has a large, statistically significant, positive effect on the public access scale. This relationship presumably reflects the association between low income and increased likelihood of going to strange buildings, grocery shopping, and going to restaurants and cafeterias alone. Since low income participants were more likely to live in smaller households, it seems reasonable that they are required to be more active in these areas in order to survive, and more specifically, in order to eat. This "necessity" hypothesis is consistent with the fact that income shows its largest negative effect on the information scale, which includes the activities that are least "necessary," such as going to plays and movies.

Rehabilitation Training Factors

Neither of the variables for the two types of rehabilitation training produces a statistically significant effect on any activity scale, once all the other factors have been controlled. The effects of rehabilitation training, even at nonsignificant levels, appear mixed. Both types of rehabilitation training appear to increase the information activity scale, partially sighted training programs slightly more so than training programs for the blind. When only visual condition factors are controlled (i.e., visual factors and rehabilitation training are regressed on the activity scales), this relationship remains the same and the effect of partially sighted training reaches significance. The effect in this simpler model is larger among older participants (over age 50) than younger, larger among females than males, and larger for low income than for high income participants, reaching statistical significance in all three breakdowns. On the other hand, rehabilitation training for the blind is positively associated with higher levels of home task activities than is partially sighted rehabilitation training. Relationships to the other activity scales seem neither consistent nor stable either when demographic factors are statistically controlled or when they are left out of the equation entirely.

Summary of Analysis of Activity Levels

It seems clear that very limited vision and recent onset of visual problems are associated with reduced levels of activity. However, when these factors are controlled, demographic factors are also strongly associated with activity levels, both positively and negatively. Age, particularly after age 65, shows a consistent negative association with activity. Education, or having a college degree, shows a consistent positive association with activity levels. The effects of sex and income are more specialized. Being female seems associated with higher levels of home-based activities, as might be expected. Low income (when education is controlled) appears to increase levels of basic survival activities and decrease levels of more optional activities.

Rehabilitation training, whether designed for the blind or the partially sighted, has no significant effect when other factors are controlled, although there is some indication that rehabilitation training for the partially sighted is positively associated with information activities, and rehabilitation training for the blind is positively associated with home tasks.

The correlations of the scales with each other range from .24 to .61, as shown in Table 5.4. The lowest correlation, .24, is between the home tasks scale and both information and public access scales. The highest correlation is between transportation and public access. This indicates that while levels of activity are strongly related, high levels of activity on one task do not imply high levels on all the other tasks.

Table 5.4

CORRELATIONS BETWEEN ACTIVITY SCALE VALUES

Activity	Personal Care	Information	Transportation	Home Tasks	Public Access
Personal care	1.00	.38	.40	.35	.43
Information		1.00	.34	.24	.41
Transportation			1.00	.38	.61
Home tasks				1.00	.24
Public access					1.00

ANALYSIS OF BLIND ORIENTATION

This analysis was conducted in much the same way as the analysis of activity levels. Five items reflecting orientation toward a blind life-style were recoded into dichotomous variables, added, divided by the number of items, and multiplied by 100. The reliability of this scale is .85, as measured by Chronbach's alpha. The items included in the scale were use of a guide dog, use of a white cane, considering a social group of visually impaired people a very important part of the

participant's social life, indicating that all or most close friends are totally blind, and that being around partially sighted and blind people is more comfortable for the participant. These items are shown in Table 5.5.

Table 5.5

VARIABLES INCLUDED IN BLIND ORIENTATION SCALE

Question Number	Variable	Reliability
158	Use guide dog	.85
160	Use white cane	
481	Visually impaired group socially important	
484	Most friends are totally blind	
485	Most comfortable around blind	

NOTE: All questions reporting blind-oriented behavior (except use of braille) were included in the equation. Use of braille was omitted because the question did not indicate whether or not braille was the primary reading mode.

The correlations between this scale and the activity scales are generally low (at most $\pm$ .19) and are sometimes negative (with the personal care and information scales). This outcome suggests that there is no strong consistent relationship between indicators of blind orientation and general levels of activity. The visual impairment condition, demographic, and rehabilitation training variables described above were regressed on the blindness orientation scale. It can be inferred from the level of the resulting constant, 4.09, that the overall level of blindness orientation is very low, especially compared with the activity scales whose constants range from 44.49 to 75.14. The multiple R was .66 with an adjusted R^2 of .38. Results are shown in Table 5.6.

Table 5.6

REGRESSION OF VISION, DEMOGRAPHIC, AND REHABILITATION TRAINING VARIABLES ON BLINDNESS ORIENTATION SCALE

Independent Variable	Unstandardized Regression Coefficient	Standard Error	Standardized Regression Coefficient
VPSER	10.24*	4.88	.24
NEWPS	-2.72	5.08	-.06
NEWSER	-6.50	8.40	-.19
COLGRAD	-1.10	3.69	-.03
OLDAGE	-4.87	4.57	-.10
FEMALE	0.62	3.36	.00
LOWINC	10.67*	3.33	.27
PSTRN	-6.82	4.14	-.15
BLNDTRN	21.72*	3.60	.52
Constant	4.09		
Multiple R_2	.66		
Adjusted R^2	.38		

NOTE: * indicates significance at $\alpha = .05$ level.

Having a very serious visual impairment is significantly and positively associated with a blind orientation. However, recent onset of the visual problem is negatively associated with a blind orientation. This is not surprising, since many of the items in the scale, such as choice of close friends, are not subject to rapid change following a change in vision.

Education, sex, and age appear to have little effect on blind orientation, but income has a significant effect. Low income participants, even when other factors were controlled, had higher scores on the blind orientation index. However, we should note that only a correlation, and not a causal relation, has been established between the two variables.

Last, rehabilitation training showed a strong association with blindness orientation. Participants who had had rehabilitation training for the blind attained significantly higher scores on the blindness orientation index than those who did not. Those who reported rehabilitation training for the partially sighted, on the other hand, had lower (but not significantly so) scores on the blindness orientation index than participants who did not.

CONCLUSIONS

From the analyses described above, we can conclude that our basic hypothesis was correct: Factors other than the seriousness of visual limitation do affect activity levels. The important demographic factors we found to be associated with activity levels are education, age, and sex. Rehabilitation training to overcome visual handicaps appears to have less consistent or significant effects on levels of activity than visual impairment or demographic variables.

To move beyond these conclusions, we can speculate on the basis of measures of relationships that do not reach statistical significance. It appears that duration of the visual problem can affect activity level, suggesting that there may be a period of learning and adjustment that lasts several years. It also appears that women and older people tend to have reduced outside activities and participate more in home-based activities.

These findings imply that a particular subset of the partially sighted is likely to manifest a very low activity level due to a combination of factors. Older adults who have recently become partially sighted and who have severe limitations in vision are likely to become quite inactive and may need special help in adjusting to reduced sight and learning compensatory skills.

While specific levels of activity are positively correlated with each other, the orientation toward blindness is not clearly associated either positively or negatively with activity. Rather, it appears that orienting toward a blind instead of a sighted mode is a choice of

life-style. Choosing to adopt blind techniques and to associate most closely with visually impaired people is significantly related to severity of visual limitation, low income, and having received rehabilitation training as a blind person. Negative relationships in the data (not reaching statistical significance) indicate that an orientation toward blindness may be more closely associated with younger adults who have been partially sighted for a substantial portion of their lives.

AREAS FOR FUTURE RESEARCH

Three areas for future research seem most important, based on these data. First, a better specification is needed of the nature of the relationships between visual field and acuity limitations and activity levels (Genensky, 1976). While constraints of a small sample size required simplification of these relationships, much may have been lost thereby. Using continuous variable measures of acuity and field capabilities, for example, would be preferable to using categories.

Second, relationships between age and activity levels should be examined more closely. It appears that older partially sighted people are less active because of the severity and recent onset of their visual problem, but there is probably a significant decrease in activity associated simply with age. It would be useful to explore this area more fully to determine whether the relationship differs from what would be found among fully sighted older adults. It would also be desirable to explore the role of general health for older partially sighted people.

Third, the relationship between an orientation toward blindness and general activity levels should be further explored. It is unclear from this study whether adoption of a blind orientation is associated with either overall levels of activity or with any specific kind of activity.

The kinds of rehabilitation training available in general life skills for partially sighted people need to be carefully evaluated. The only significant effect of rehabilitation training found in this

study was an increase in blind orientation. This result may indicate that, in the past, rehabilitation training for the blind has done a disservice to the partially sighted, while rehabilitation training for the partially sighted has been ineffective in teaching skills that would enable people to lead more active and independent lives.

Chapter 6

CONCLUSIONS

The results of this study are both broad and complex. The considerable amount of data collected helps fill a long-existing gap in our knowledge about partially sighted persons. Our aim in this research has been to collect and present data in a way that will provide a basis for understanding the needs of the partially sighted and will suggest ways to improve service delivery for this population.

In reviewing our conclusions, we first describe the modal respondent. We then summarize what our respondents can do successfully using residual vision, in contrast with those who are functionally blind. We then present VEAPs that constitute serious problems for this population along with recommendations from respondents and researchers for overcoming some of them. Next we discuss the pressing need for adequately prescribed visual aids, suggesting how these aids can overcome some reported VEAPs and indicating general barriers that may lead to inadequate service delivery. The impact of the rehabilitative training received by our respondents is also summarized. Activities of our respondents are related to demographic variables, visual impairment, educational level, rehabilitation training, and orientation as blind or partially sighted. Finally, on the basis of these research conclusions, we suggest areas for future research and make recommendations for policy changes.

THE MODAL RESPONDENT

The modal respondent in this study is 47 years of age, white, has at least a high school education, works at least part time, and has a current family income of less than $10,000 per year. The majority of the respondents are legally blind and have been severely impaired for a minimum of 5 years (the mean is 21 years). The respondents use an average of four visual aids each, and virtually all use at least one visual aid.

USING RESIDUAL VISION

The results of this study support our initial conjecture that partially sighted persons using their residual vision are able to do many things for themselves that are beyond the sensory capability of the functionally blind. As Chapter 3 pointed out, for example, they are able to walk down even an unfamiliar street without bumping into trees, parking meters, fire hydrants, or parked cars. Further, when the partially sighted are equipped with appropriate visual aids, their range of activities is expanded, they can perform many habitual tasks more rapidly and more thoroughly, they are able to read a wide variety of ordinary ink-printed materials, and some are able to cope with even the smallest type sizes.

It is also clear that most older persons who become visually impaired later in life have little or no desire to give up their sighted life-style and to be regarded as functionally blind. On the contrary, they want to remain among the fully sighted. Although we believe it would be salutary for them to confront their partial visual loss in order to cope effectively with their low vision, we warmly support their unwillingness to be classified as functionally blind. A resignation to "blindness" implies the surrender of the valuable remaining powers of residual vision and the acceptance of a much more restricted life than is warranted.

DEALING WITH VEAPS

Attempting to categorize the environmental problems of partially sighted persons is a complex task. For purposes of exposition we have organized them in the following way: outdoor mobility; public transportation; indoor orientation; activities involving heavy dependence of our respondents on other people; problems of the classroom; and home environment.

Outdoor Mobility

When questioned about coping with the problems of moving about out of doors, a surprisingly small number of respondents mentioned

that they use visual aids. The reason may be that many respondents were referred to us by their optometrists or ophthalmologists, who tend to concentrate on trying to help patients with reading, writing, and similar near vision tasks, and give less attention to distant vision needs. Visual aids such as binoculars, monoculars, and telescopic spectacles could probably help many partially sighted people cope with such formidable VEAPs as detecting the presence of descending curbs or stairs, avoiding tripping over or bumping into small obstacles, or observing the signals of a policeman directing traffic. On the other hand, some respondents, using no visual aids at all, have solved in an interesting way the problem of knowing in daytime when a traffic light at an intersection is red or green. Because many partially sighted people find it easier to recognize a yellow light in daytime, they watch the traffic signal that is at right angles to the direction they are traveling; when that signal turns yellow, they deduce that the light is about to turn green in their direction. The problem of stairs can be easily ameliorated by marking the leading edges of both the runner and riser with a paint or non-skid material that is in high contrast in color and gray value to the color and gray value of the stairs themselves.

Public Transportation

Regarding VEAPs at airports, bus stops, and the like, our respondents recommended larger and more rationally placed signs. They also called for layout maps located at eye level, and for marking the runners and risers of stairs, as mentioned in the previous section.

Many of the respondents' suggestions deserve consideration, but it is also clear that with appropriate visual aids and thorough training in their use, the respondents would find it much easier to cope with complex public environments. In particular, such visual aids as binoculars, monoculars, and telescopic spectacles would probably enable partially sighted persons to travel on public transportation more confidently, even though the aids will not ensure success in locating unfamiliar destinations.

Indoor Orientation

In public buildings, our respondents repeatedly emphasized the need for larger and more rationally located signs placed at eye level. Visual aids might partially alleviate the need for larger signs, but the proper positioning or repositioning of signs would also be a simple enough partial solution. Problems of this sort can be solved, however, only through the joint efforts and cooperation of such persons as low vision specialists, building owners, architects, planning commissioners, and the partially sighted themselves--armed with knowledge about the latest advances in technology. But solutions will probably not be generated unless the community at large is made aware of the problems and what should and can easily be done to overcome or reduce them. A very large wall directory may not be considered to be practical for an office building, and it may be impossible to alter the size of a library card catalog; but a wall directory can be placed so that a partially sighted person can see it adequately with, for example, binoculars, a monocular, or telescopic spectacles; and a partially sighted person equipped with and trained in the use of near vision aids will often be able to use a library card catalog effectively.

The very critical problems of being able to locate public restrooms and of differentiating them by sex can be solved quite simply, as well. Up-raised panels roughly 2 feet wide and 2 feet high, can be placed on men's and women's restroom doors. The panels should be of distinctly different geometric shapes-- for example, the panels on the men's restroom doors might be equilateral triangles, and those on the women's restroom doors might be circles. The panels should also differ distinctly in color and gray value, both from one another and from the doors themselves. This solution would be helpful for both partially sighted and functionally blind persons.

Cafeterias, on the other hand, remain a difficult problem. They may never offer a really comfortable environment for most partially

sighted persons, but appropriate visual aids might render the problem less formidable.*

When questioned about department stores and supermarkets, respondents emphasized dependence on others more than they did in any other area. Suggestions for making shopping easier for partially sighted persons heavily emphasized the need to increase the size and to improve the color contrast of signs and labels, as well as the need for consistency in the placement of signs and product displays. For many partially sighted persons, especially those with very low visual acuities, there currently is not a fully satisfactory visual aid for coping with all the visual demands of these consumer environments.

It is also evident that the best resource our partially sighted respondents have is their own ingenuity. We are impressed with the ways respondents handled the problem of determining when to get off an elevator. One respondent knows that the desired floor has been reached when the light on the button panel below (or above) the selected one has gone out. Others wait until the elevator doors have opened on the floor thought to be the correct one; confirmation is obtained by again depressing the floor button. If the doors remain open or if they close and then open again, the elevator is indeed at the correct floor; whereas if the doors close and the elevator continues to another floor, the correct floor has not yet been reached. This latter method works more universally, since many elevators do not have illuminated buttons but do follow the principles that are needed to use the second technique.

Dependence on Other People

In many other areas as well, our respondents find themselves considerably dependent on others. For example, many cannot read the

---

*If the "appropriate visual aids" are spectacles that give a large field and an image that is magnified, this last statement is probably true. However, if the appropriate visual aids are binoculars, a monocular, or a pair of high power (say 4x or 6x) telescopic spectacles, then this statement may not be true, because users may need so much time to scan the array of foods that they would become bottlenecks in the cafeteria line.

meter in a taxicab and must rely on the driver's honesty. At least 30 percent of those who have checking accounts rely on others to help them write checks. We suspect that many visually impaired people do not know that a simple checkwriting guide or template is available for a reasonable price. Many partially sighted people find it troublesome to read a menu or check in a restaurant. Sometimes a penlight solves the problem; but more often than not, the penlight must be used together with a visual aid that was prescribed for reading under less severe ambient illumination conditions than those encountered in many restaurants.

Problems of the Classroom

One of the potentially most important environments in the life of a partially sighted young person is the classroom. There, if appropriate visual aids were available, the students could function more effectively than they have in the past. If students at any grade level are to get the most out of their classroom experience, it is essential that they be able to read material on a chalkboard and see other objects at a distance, such as maps and charts at the front of the room. Going up to a chalkboard to view material closely or going up to the chalkboard after class are grossly inadequate solutions to some of these problems; in these situations several respondents reported that they felt embarrassed, introverted, abandoned, or timid. Some attributed the discontinuation of their education to visual problems, which is both tragic and unnecessary. As pointed out above, individual visual aids can certainly help partially sighted students to see the material necessary for their education; and more elaborate systems (such as interactive classroom television systems) can enable even severely impaired elementary school students to enjoy visual experiences in the classroom more comparable to those of their fully sighted peers.

Problems of the Home Environment

At home, visual aids can help respondents to cope with problems such as tripping over or bumping into obstacles, measuring things

correctly, and adjusting the stove. While it is comforting to know that 70 percent can give first aid, it is discouraging to learn that 72 percent of our respondents have trouble reading labels on medicine bottles (this is a crucial task in which mistakes can inflict severe consequences). Appropriate visual aids can also alleviate many of the personal and grooming problems noted by our respondents, who would then need less help from fully sighted people.

Television was found to be important in the home life of our respondents. Most of them sit from one to three feet from the screen. Similarly, most of those who go to the theater prefer to sit in the first rows. With the help of distance viewing visual aids, many of these people would have greater flexibility in seating choices. In sporting events distance from the action presents a similar problem, compounded by the difficulties of moving around in a crowded stadium, finding refreshment stands, and reading scoreboards--all of which could be lessened considerably by the use of appropriate distance-viewing visual aids.

Many respondents suggested other solutions to VEAPs, all of which have been reported here, that are relatively simple and would make a significant difference for other partially sighted people. Interestingly enough, the changes currently being made in some environments to help other kinds of handicapped persons may pose additional problems to the partially sighted and the functionally blind. For example, it is possible that the placement of telephones in booths at waist level to accommodate wheelchair users may hinder partially sighted persons. Likewise, the ramps at street corners designed for wheelchairs present a recognition problem for functionally blind people approaching such corners. One solution to this problem would be to make grooves in the sloping concrete (in the direction of the slope) by using a rake-like instrument at the time the cement for the ramp is poured.

Even with the help of appropriate visual aids, the ingenuity of the partially sighted, and the genuine concern of the general public, some VEAPs will continue to face the visually impaired. One persistent problem is that of adjusting to a rapid and sharp change in ambient illumination, such as occurs in moving from a bright daylit area into

a dark room. Under these circumstances many partially sighted persons are effectively functionally blind for varying periods of time (periods that are far greater than those for fully sighted people), and some are completely unable to adjust to the reduced level of illumination no matter how much time they spend in the darkened environment (e.g., persons with retinitis pigmentosa). The reluctance of many partially sighted people to walk alone at night--partly due to visual factors and partly to other factors such as fear of street crime--will probably not be significantly altered by the wider use of visual aids. And, as noted above, shopping in large stores, selecting food in cafeterias, and riding unfamiliar bus routes will probably continue to pose problems even if partially sighted people are provided with appropriate visual aids and thorough training in the use of those aids. Nevertheless, with better service delivery, the partially sighted will be more on a par with their fully sighted peers.

VISUAL AIDS

Appropriate visual aids that are currently available could help most of the 22 percent of our respondents who do not read ink-printed material such as a phone book, a dictionary, a paperback or hardcover book, a large-type newspaper or book, or a regular newspaper. These visual aids might also reduce the number of respondents who have difficulty reading handwriting of any kind, although writing itself does not seem to be as formidable a problem as we had anticipated for our respondents, half of whom use visual aids to write. Generally, however, it was startling to learn how many VEAPs continue to pose problems that could be overcome or at least greatly eased by use of already available or soon to be available visual aids, such as microscopic or telescopic spectacles, binoculars, monoculars, passive infrared night viewing devices, closed circuit TV systems, and interactive classroom television systems (ICTSs). The fact that more appropriate aids are not being used by partially sighted people to cope with their VEAPs is probably due to their lack of knowledge concerning those aids and to insufficient or inappropriate training in their use. The value of the aids currently in use is evident

throughout this report, especially in the discussions in Chapters 3 and 4. There appears to be a preponderant emphasis on ordinary spectacles and other aids that fit into an eyeglass frame. This is not surprising, since most clinicians, whether they are optometrists or ophthalmologists, have been trained to equate visual aids with eyeglasses. Even those who give special attention to low vision procedures tend to emphasize visual aids that can be inserted in spectacle frames. Many valuable aids, however, in no way resemble a pair of spectacles, for example, binoculars, monoculars, and closed circuit TV systems (CCTV systems). Further, when clinicians recommend monoculars and binoculars, they usually prescribe devices that are very compact and easily concealed from view. Unfortunately, these compact devices all too frequently fail to provide an image that is sufficiently magnified or that encompasses a sufficient viewing area. The result is that many patients are unable to clearly and intelligibly view such things as plays, sports events, or distant scenery.

It may be that partially sighted persons, out of concern for their personal appearance, often shy away from visual aids that they regard as unusually conspicuous--all the more so if they perceive that the ophthalmologist or optometrist also finds such aids obtrusive. We believe that any aid that helps partially sighted persons to participate visually in activities that they enjoy should be considered without bias by prescribing clinicians.

EDUCATIONAL TRAINING

Our respondents show a high level of educational achievement, but regular classroom settings have posed significant VEAPs for them. Of the 52 percent who experienced visual impairment during their educational years, only half received special assistance for the visually handicapped. It is unclear whether VH assistance involved training in the use of residual vision, nor do we know the extent to which visual impairment limited our respondents' educational expectations and attainments, if at all.

The responses were also insufficient to determine the adequacy of vocational training in relation to actual or desired occupational

goals. Several statistics stand out, however: 73 percent of those currently employed (n=42) said they do things differently from fully sighted employees; 64 percent indicated problems on the job due to vision; and 91 percent of 91 persons responding said they thought their vision was an important factor in the kinds of jobs they could find. Training programs designed to alleviate VEAPs in various careers are clearly warranted. In addition, existing occupational programs for the visually handicapped need to be assessed in terms of whether or not they emphasize use of residual vision, employ existing technology, and encompass other areas besides skills and crafts.

Our respondents sought the assistance of many organizations for the visually handicapped. Among them, the most frequently mentioned was the talking book library of the Braille Institute of America, a service originally designed for people with little or no useful residual vision. Although respondents' comments about these organizations were generally positive, it is difficult to determine whether any of these programs were helpful in terms of people's adjustment to a partially sighted (rather than blind) life-style.

We attempted to measure the relative effects of "blind" versus "partially sighted" training of various types on the lives of visually impaired people (see Chapters 4 and 5). We were unable to draw strong conclusions, however, largely because we had to rely on respondents' judgments about the type of training they had received. Most of them probably lacked sufficient experience to make the distinction, particularly because training for the partially sighted is a rare commodity. Mobility training is a typical example. Respondents reported that most mobility instructors encourage clients to use a white cane and sometimes insist that they be blindfolded when being taught cane travel--a practice quite inappropriate because it deprives partially sighted travelers of their most important visual aid, their residual vision. While we recognize the occasional usefulness of a cane as a signal of visual impairment to sighted persons, we are not convinced of its utility for most partially sighted people. It is certainly inappropriate when partially sighted persons have at least one relatively normal visual field, unless, independent of their visual

status, their reaction rates are too slow to make it safe to move about on busy streets without a cane.

ACTIVITY PATTERNS

In studying activity patterns of the partially sighted, we found college graduation to be associated with increased activity across a number of areas, particularly the areas of information and public access. On the other hand, older respondents appeared to be less active, especially on dimensions of information, transportation, and public access. In addition, females seemed to be slightly less active than males, although the difference was not statistically significant. Not surprisingly, females showed higher degrees of activity on the home tasks scale. The last demographic variable examined, income level, was weakly related to activity levels of our partially sighted respondents, but much of the observed effect of income was attributable to its correlation with education. Further, respondents with lower incomes were more active in the domain of public access, suggesting a "necessity hypothesis." This hypothesis receives some support from the direct relationship between income and household size, which may require greater independence among low income respondents who have fewer other people on whom to rely.

We found serious visual impairments to be significantly associated with lower activity levels in the areas of personal care and information, while more recent impairments are significantly associated with increased activity at home. Not surprisingly, the overall impact of seriousness and recency taken together is generally negative and is most substantial in the areas of information, transportation, and public access; a positive effect appears for home tasks. From these data we hypothesized that persons with a recent serious impairment spend a good deal of time at home, not often venturing out.

Our analysis of the relationship between kinds of visual rehabilitation and activity levels of our respondents showed no effects for any type of rehabilitation independent of demographic and visual impairment factors. Considering only visual factors and rehabilitation training as predictors (excluding demographic factors), the advantage

of partially sighted over blind oriented training becomes statistically significant, especially in relation to information, and the effect is stronger for older persons, females, and lower income respondents. On the other hand, blind training is associated with increased home activity.

Treating blind orientation as an attitude scale, we found--not surprisingly--that blind training yields a higher degree of blind orientation, while partially sighted training yields individuals with lower (but not significantly so) blind orientation scores. Finally, we learned that seriousness (but not recency) of visual impairment is significantly associated with a blind oriented attitude.

RECOMMENDATIONS FOR POLICY CHANGE AND FUTURE RESEARCH

Approached from a variety of viewpoints, the information gathered in the course of this research makes it clear that partially sighted people are not blind people. They have residual vision that they can use, along with their other senses, to function in the sighted society. We believe that, for most partially sighted people, it will require the help and support of the federal government if they are to achieve an identity as partially sighted or low vision people rather than as blind people. This support should consist of the government's formal recognition of the partially sighted as a separate and distinct group from the functionally blind, followed by separate allocation of funds and other forms of assistance for these groups. If this were done, we believe that state, county, and local government agencies, as well as most private groups serving the visually impaired, would recognize the separate existence and distinct needs of these two very important visually impaired populations.

The study also indicates that partially sighted people are probably not being trained to make maximal use of their residual vision. In fact, as Chapters 4 and 5 indicate, they are sometimes given rehabilitation training designed for the functionally blind. When this occurs, the partially sighted tend to assume the role of the functionally blind and needlessly limit their visual horizons. That partially sighted people, whether legally blind or not, are not functionally

blind was known before this study, but the manner and degree to which they differ from the functionally blind had not been mapped.

The results of the study strongly argue for greater emphasis in schools and in vocational training programs on the use of residual vision. This is particularly evident in Chapters 3 and 4, where problems of information exchange in a typical classroom setting are discussed. Teachers of the visually handicapped should be taught to distinguish clearly between partially sighted and functionally blind students, to understand the importance of residual vision, and to instruct students in the use of that vision. Currently, the emphasis in training programs for VH teachers is heavily weighted toward techniques that, at best, are appropriate for persons with no eyesight.

Although this study did not examine in detail the question of third-party payment for visual aids for the partially sighted, it should be noted that many needy partially sighted persons are unable to pay for the visual aids that they require to function efficiently and effectively. This is particularly true of partially sighted persons who are under or over the age range served by the various state departments of rehabilitation. In theory, Public Law 94-142 money should be available to purchase aids for partially sighted school children, but because such funds are very limited and because they are to be used for ameliorating all types of impairment in children, they cannot fulfill the visual aid needs of all or even a very significant portion of the country's partially sighted students. Further, even for aids covered by such funds, an alteration in policy would be needed before partially sighted children could take the aids home to help them cope with homework and with extracurricular visual needs.

Older persons constitute the other major group of partially sighted Americans who have no third-party source if they or their family cannot afford to pay for visual aids. Medicare, with one exception, equates visual aids with ordinary eyeglasses and hence does not cover them. The exception is cataract spectacles to be worn by persons who are aphakic (i.e., have had one or both lenses removed from their eyes). In this case, Medicare views the spectacles as a prosthesis that replaces the

crystalline lens of the eye. We believe that other visual aids used by partially sighted persons should also be regarded as prostheses, because they replace or at least significantly assist a damaged or missing portion of the eye, for example, a macular degenerate retina, a pigmented retina, a cataracted lens, or a scarred cornea. Chapter 4 contains a discussion of which visual aids should be looked upon as low vision aids, and it provides criteria for determining whether a spectacle lens or contact lens is or is not "unconventional," i.e., does or does not constitue a special low vision aid. These low vision aids should not be classified as or equated with ordinary eyeglasses. Rather, we believe that a list of exceptional visual aids should be compiled, and these aids should be made available to partially sighted older persons via Medicare or other third-party payers when the older persons are unable to pay the cost. That list should include, for example, CCTV systems, monoculars, binoculars, telescopic and microscopic spectacles, handheld and stand magnifiers, and "unconventional spectacles." We believe that exceptional visual aids could be made available to partially sighted older persons at an annual cost that would be quite reasonable compared with the cost of other medical services currently paid for by the federal government for most older adult citizens.

Finally, our analysis of the levels and types of activities in which our respondents were involved suggests at least four important areas for future research: refinement of the measurement of functional residual vision; the relationship between visual field and acuity limitations and the activity types and levels of partially sighted people; the relationship between age and activity type levels in the partially sighted; and the relationship between blind orientation in partially sighted persons and their activity types and levels. We have found that there is a particular subset of partially sighted people who are likely to be less active and to need special help, namely those who have recently become partially sighted and have very severe visual limitations--especially those who are older, female and lower in education and income. For these groups, model programs aimed at increasing the scope of functional effectiveness might prove especially beneficial.

Appendix A

AGREEMENT OF SELF-REPORTS AND OBSERVATIONS OF ABILITY TO COPE WITH VEAPS

The mobility portion of the data collection was designed to provide observer ratings of participants' abilities and reactions in environmental situations, and behavorial counterparts of some of the situations described verbally in the interview. Both the questionnaire and the mobility test were designed to stand on their own for purposes of analysis, but the overlap between them provides a measure of agreement between self-reports and behavioral observation by others. Although there is some question as to which measure is the more accurate if the mobility observation and the self-report disagree, we are assuming for this discussion that the observation can be used to judge the accuracy of the self-report.

We conducted this analysis by matching questionnaire and mobility test items. We chose from the interview ten items (Table A.1) that measured the ability to perform a task that also occurred on the mobility test, and that were unaffected by skip patterns or nonresponses that would deplete sample size for an item. A criterion of

Table A.1

MATCHED ITEMS FROM QUESTIONNAIRE AND MOBILITY TEST

Matched Item Number	Item Description	Questionnaire Item Number	Mobility Test Item Number
1	See vertical obstacles	165a-c	9G
2	Find bus stop	179	13A
3	See details on TV	387	3E
4	Find elevator button	221	8B
5	Locate right floor in elevator	222	8C
6	Locate room in building	209e	7A
7	See parked cars	165j	11D
8	Locate steps down	218b	9D
9	See crosswalk lines	173c	15C(2)
10	Locate curb edge	165h	15C(1)

Table A.2

ACCURACY OF REPORTS OF ABILITY TO DO TEST ITEMS

(In percent)

Matched Item Number	Item Description	Report of Ability				
		Correct	Under-Estimate	Over-Estimate	Total	Number Of Cases
1	See vertical obstacles	93	5	2	100	45
2	Find bus stop	62	11	27	100	44
3	See details on TV	91	1	7	99	69
4	Find elevator button	51	49	--	100	47
5	Locate right floor in elevator	61	27	12	100	49
6	Locate room in building	68	32	--	100	40
7	See parked cars	94	2	4	100	47
8	Locate steps down	53	47	--	100	49
9	See crosswalk lines	93	4	2	99	45
10	Locate curb edge	78	22	--	100	46

agreement was defined for each item. While the exact criterion was different for each item, the principle was that an indication in the questionnaire that the person could do the task, even with difficulty, "matched" the mobility report if the participant was able to complete the comparable task, even with difficulty. Once the criterion for matching each item was defined, the two source items were compared and a new matched-item variable was created, which could take four values:

Derived Variable Values

Ability Demonstrated in Mobility Test	Ability Reported in Questionnaire	
	Yes	No
Yes	1 = Correct	3 = Underestimate
No	2 = Overestimate	4 = Correct

In the "correct" response situations (codes 1 and 4), the participant accurately assessed his abilities. In the discrepant case coded 2, abilities were overestimated; in the code 3 case, abilities were underestimated. As evident in Table A.2, for most matched items participants correctly assessed their capabilities; when they did not, the tendency was to underestimate, not overestimate. Participants were able to report what they could see (items 1, 3, 7, 9) most accurately. (For nearly all the matched items, 90 percent or more of the "correct" reports were by participants who said they were able to do something and could do it when tested.) Items requiring actual movement of the body in locating an object were less accurately assessed. Overall, however, most reports were accurate and overestimates of abilities were not frequent.

These matched items were combined into an accuracy scale for individuals. Each item was scored dichotomously, with agreement between mobility test and questionnaire receiving a value = 1 and

disagreement a value = 0. The ten item scores were summed for each participant and divided by the number of complete items to form a percentage-accurate scale for each case.* Table A.3 shows the distribution for this scale; 20 percent of the cases were nearly entirely accurate and nearly all cases, or 88 percent, were accurate for more than half the items we were able to match.

Table A.3

ACCURACY OF PARTICIPANTS' REPORTS OF ABILITY TO DO TASKS

Percent of Items Accurately Reported	Percent Of Cases
41-50	11
51-60	20
61-70	25
71-80	9
81-90	14
91-100	20
Total	99
Total cases	44

CONCLUSIONS

Participants were able to report their abilities with considerable accuracy. Ability to do most tasks was judged similarly by participants and by observers. Inaccuracy was primarily in the direction of underestimation of abilities by participants. It appears that tasks requiring only vision are more accurately reported than tasks requiring vision and action.

*Cases with more than 2 incomplete items were not included in this analysis. This left 44 valid cases.

Appendix B

AGREEMENT OF PARTICIPANTS' AND PHYSICIANS' DESCRIPTIONS OF VISUAL CONDITION

Descriptions of the cause of visual impairment given by physicians and their patients sometimes do not agree. Some physicians do not provide detailed information to their patients; some patients do not wish to know the exact nature of their problem or can't remember. To explore this, we requested descriptions of visual condition from each participant during the interview and from their ophthalmologist by means of a mailed request. Ophthalmologists returned information for 84 participants. The information obtained included type of impairment, rapidity of onset, and prognosis. These data were compared with data provided by the participant for each case. The results are presented below.

TYPE OF IMPAIRMENT

Both physicians and participants were asked to describe the visual condition in their own words. These open-ended responses were later coded into the same ten visual condition categories used to stratify the sample (see Chapter 2). Two people, working independently, completed this coding. These categories are: cataracts, glaucoma, retinal degeneration, other retinal, optic nerve degeneration, retrolental fibroplasia, myopia, uveitis, "combination of conditions," and "other." The codes given to participant and physician descriptions for each participant were then compared.

In 62 cases out of 84, the descriptions given by participants and their ophthalmologists were coded into the same category. Five participants were unable to describe their visual condition in enough detail to permit coding, and in 17 cases the physician and patient disagreed substantially on the diagnosis. This means that about three-fourths of the participants were able to describe their visual condition accurately.

ONSET OF VISUAL CONDITION

Onset of visual condition was coded into "gradual" or "immediate." Seventeen physicians and three participants failed to provide data on type of onset. Of the 64 cases for which complete data were available, 56 cases, or 88 percent, indicated agreement between the physicians' and participants' description of onset.

PROGNOSIS FOR VISUAL CONDITION

Prognosis for visual condition as described by participants and physicians was coded into three categories: "remain stable," "deteriorate," and "other," which included both improvement and variation over time. Data from participants and their ophthalmologists were complete for 77 cases.

Physicians and participants described a similar prognosis in 38 of these cases, or only about half of the time. Overall, participants were more hopeful than physicians: 48 described their cases as stable and 7 thought their condition might improve or vary over time. Only for 28 cases did physicians describe participants' conditions as stable, and no physician expected improvement. In only 5 cases was the participant more pessimistic than his or her ophthalmologist.

CONCLUSIONS

Most participants were able to describe their visual conditions accurately, and most participants and ophthalmologists agreed on the speed of onset of the visual condition. However, physicians were much less hopeful than patients about the prognosis for these visual conditions. Physicians agreed with only 20 of the 55 participants who felt their conditions would remain stable or improve over time, and overall only about half the participant and ophthalmologist descriptions of prognosis were in agreement.

Appendix C

VISUAL CONDITION CODES

Although this study was designed to provide detailed data on the measured visual field and acuity of participants with and without their aids, it became apparent that a summary form of the data was also needed. Many analyses required a measure of the visual condition, but the individual measurements were too cumbersome for this purpose. Since the number of cases was small, we decided to construct summary measures based on hand-coding of the laboratory data.

DEVELOPMENT OF CODES

The codes were designed separately for "reading" and "mobility." We felt that the degree of difficulty a particular condition would cause would be different for tasks requiring close, detailed scrutiny than for those requiring general awareness of spatial relationships. For each class of activity, we sought to define categories that would provide meaningful distinctions between levels of difficulty a particular visual problem would cause, based on previous observation of partially sighted people. We defined categories separately for visual field and acuity and for an overall measure of difficulty. The visual field and acuity codes are "objective" in the sense that a measurement for a participant is compared with a set of previously defined measurement categories. The overall measure is more "subjective" in that the coder was required to consider both field and acuity and decide on a single best description of level of seriousness, based on her own experience.

The codes were developed by a work group of six people, including three optometrists specializing in low vision patients. Other members were from the project staff. Discussion was held until a consensus was reached on the coding scheme. The coding categories are shown in Tables C.1 and C.2.

Table C.1

READING/CLOSE WORK CODES

Note: Code with best correction participant had.
Consider best vision with both eyes.
Code field and acuity separately and together.

Field	Acuity/ Reading Ability	Overall Seriousness	Code
Central scotoma with radius of more than 6°	26 point type or larger or could not read at all	Extremely serious	1
Central scotoma of 3°-6° radius	14-26 point type	Very serious	2
Hemianopia	8-14 point type	Moderately serious	3
Peripheral defect (remaining central field 7° or less)	5-8 point type	Some Problem	4
Upper or lower field impaired or no restriction	4 point type or smaller	Minor Problem	5

Table C.2

MOBILITY CODES

Note: Code with best correction participant had.
Consider best vision with both eyes.
Code field and acuity separately and together.

Field	Acuity	Overall Seriousness	Code
Smaller than 3° radius	20/800, 10/400, 5/100 or less	Extremely serious	1
3°-6° radius	20/800-20/400	Very serious	2
Altitudinal hemianopia or 6°-15° radius	20/400-20/150	Moderately serious	3
Lateral hemianopia or peripheral defects limiting 2 quadrants to 15° or less	20/150-20/70	Some problem	4
Central scotoma $\leq 25^{o}$ or no restriction	20/70, 10/50, or more	Minor problem	5

CODING OF DATA

The data were coded by an optometrist, using the coding charts and the data from the laboratory reports. Six codes were assigned for each person: acuity, field, an overall code for reading, and similar codes for mobility. The codes were checked and entered into computer files with the analysis data.

CHARACTERISTICS OF THE CODES

The distribution of codes was discussed in Chapter 2. We also computed a correlation matrix for the codes, shown in Table C.3. For

reading, the acuity code was clearly a stronger determinant of the overall reading code than visual field. The opposite is true for mobility, where field was weighted more heavily than acuity in arriving at an overall code. The correlation for field and acuity for both activity types is low. The overall codes are strongly correlated: reading difficulty is likely to match mobility difficulty.

Table C.3

CORRELATIONS OF ACUITY, VISUAL FIELD, AND OVERALL RATINGS FOR READING AND MOBILITY

	Reading			Mobility		
	Acuity	Field	Overall	Acuity	Field	Overall
READING						
ACUITY	1.0	.36	.90	.73	.38	.59
	FIELD	1.0	.61	.44	.50	.53
		OVERALL	1.0	.76	.43	.66
MOBILITY						
			ACUITY	1.0	.35	.61
				FIELD	1.0	.85
					OVERALL	1.0

WHAT THE CODES MEAN

This coding scheme should be regarded as a short-form description of the functional difficulties that participants' visual problems are expected to cause. They are based on the observations and professional judgments of persons who work with low vision patients. These judgments may be biased in some unknown way, although the pooling of several judgments will hopefully have eliminated the most idiosyncratic kinds of bias.

Appendix D

LIST OF AIDS FOR THE PARTIALLY SIGHTED

Series

100 CONVENTIONAL Ophthalmic Lenses (in frames) & contact lenses: (Conv. Ophth. lenses in frames start at 101-49, Conv. Ophth. contact lenses start at 151-199).

101 Single Vision Prescription for distance viewing (SV Rx - R).

102 Single Vision Prescription for near viewing (SV Rx - P).

103 Multifocal Vision Prescription for distance, intermediate, near viewing (Bif. Rx, Tri).

104 Single Vision aspheric &/or lenticular prescription lenses.

105 Multifocal vision aspheric &/or lenticular prescription lenses.

106 Prescription (Rx) prisms (e.g., Rx for one eye turning in or out).

151 Single Vision contact lens for distance viewing (SV CL - R).

152 Single Vision contact lens for near viewing (SV CL - P).

153 Multifocal Vision contact lens for distance, intermediate, near viewing (Bif. CL).

200 NON-CONVENTIONAL Ophthalmic lenses (in frames) & Contact Lenses: (Non-conv. Ophth. Lenses (in frames) start at 201-249, non-conv. contact lenses start at 251-299.

201

202 Iseikonic prescription lenses (e.g., Rx for aniseikonia).

203

204 Press-on Membrane lenses (e.g., for temporary correction after surgery).

205 Press-on Membrane prisms (e.g., for use in orthoptics).

206 Single Vision prescription (Rx) Microscopic lenses.

207 Multifocal Vision prescription (Rx) Microscopic lenses (bif. only).

251 Contact lenses to control aperature shape & size (e.g., after an iridectomy).

252 Contact lenses to administer medications.

253 Contact lenses to control the amount of light entering the eye.

300 Special Ophthalmic Lens Systems (in frames) & Contact Lens System: SPL Ophth. Lens System start at 301-349; CL systems start at 351-399.

301 Telescopic prescription systems for distance viewing (e.g., Feinbloom WATS Rx).

302 Telescopic prescription systems with near addition caps.

303 Telescopic prescription systems for driving a car (e.g., Feinbloom Bioptic Rx).

304 Reverse telescopic prescription systems for scanning (e.g., in field defects).

305 Near telescopic prescription systems for scanning (e.g., in field defects.

306 Near binocular telescopic prescription systems for fixed working distances.

351 Reverse telescopic contact lens systems for constricted fields (e.g., Vistacon).

400 PORTABLE MAGNIFIERS with simple element(s): (Unless otherwise stated all magnifiers listed below are single element).

401 Hand magnifiers.

402 Hand magnifiers with illumination (e.g., Coddington).

403 Pocket Magnifiers.

404 Pocket Magnifiers with more than one element.

405 Pocket Magnifiers with illumination.

406 Folding stand magnifiers.

407 Folding stand magnifiers with illumination.

408 Watchmakers loupes.

409 Watchmakers loupes with more than one element.

410 Eyeglass loupes.

411 Eyeglass loupes with more than one element.

412 Eyeglass dualoupes.

413 Clip-on loupes (monocular or binocular) (e.g., Telesight flip-on binocular loupes).

414 Clip-on loupes (monocular or binocular with more than one element.

415 Clip-on bifocal add magnifiers.

416 Headborne binocular loupes (monocular or binocular) with more than one element.

417 Headborne binocular loupes with monocular auxillary lens.

418 Headborne magnifiers.

419 Special magnifiers (e.g., pocket comparators, illuminated magnifier with fine focus adjustment, zoom desk magnifier, etc).

500 BINOCULARS, MONOCULARS, TELESCOPES, etc., that are hand held:

501 Binoculars.

502 Binoculars with add.

503 Binoculars with prescription (Rx) in eyepiece.

504 Binoculars with zoom (mechanical or electrical).

505 Miniature (pocket) binoculars.

506 Miniature (pocket) binoculars with add.

507 Miniature (pocket) binoculars with prescription (Rx) in eyepiece.

508 Special binoculars (e.g., in low illumination levels).

509 Monoculars.

510 Monoculars with add.

511 Monoculars with prescription (Rx) in eyepiece.

512 Miniature (pocket) monoculars.

513 Miniature (pocket) monoculars with add.

514 Miniature (pocket) monoculars with prescription (Rx) in eyepiece.

515 Variable focus monoculars.

516 Variable focus monoculars with add.

517 Special monoculars (e.g., Stede-eye a gimbled optical system).

518 Field glasses.

519 Opera glasses.

520 Telescopes.

521 Telescopes with add.

522 Telescopes with zoom (mechanical or electrical.

523 Miniature (pocket) telescopes.

524 Miniature (pocket) telescopes with add.

525 Headborne telescopes.
526 Headborne telescopes with prescription (Rx) in eyepiece.
527 Clip-on telescopes.
528 Clip-on telescopes with add.
529 Special telescopes.
530 Headborne monoculars.
531 Headborne monoculars with prescription (Rx) in eyepiece.
532 Headborne binoculars.
533 Headborne binoculars with prescription (Rx) in eyepiece.

600 PORTABLE ELECTRO-OPTICAL & MECHANICAL-OPTICAL Devices:
(Electro-optical devices start at 601-649 Mechanical-optical start at 651-699).
601 Image-intensifier devices (e.g., IR night viewing devices: snooperscope, or night vision pocketscopes for individuals with retinitis pigmentosa).

700 PORTABLE NON-OPTICAL DEVICES:
701 Typoscopes.
702 Penlights.
703 "White" cane.
704 Special frames (e.g., for hearing aids, tear dispensor, mirror hemianopia, sensitive skin, to hold eyelids open, flip-up)
705 Sunshades, visors, etc.
706 Occluders, clip-on or in frame, or eye patch.
707 Pinhole(s), clip-on or in frame, (single or multiple).
708 Writing guides, etc. (e.g., in signing checks).
709 Heavy lines, wide spaced paper.
710 Felt pens, etc.
711 Folding wire book stands.
712 Rubber side shields for binoculars, monoculars, sport spectacles, etc.
713 Special side shields for frames.
714 Reflectors (tape or metal) stick-on or tied (e.g., worn around arm).
715 Magic Tape (Scotch) for taping eyelid open.
716 Nose guards (suspends eyeglasses off nose to relieve pressure).
717 Safety bands (holds eyeglasses snug, prevents them from falling or slipping).
718 Chains or cords to hold aids when not in use (e.g., around neck).
719 Cases (with strap) (e.g., to hold binoculars when not in use).
720 Eyeglass cases (e.g., to prevent them from being scratched or broken.
721 Ocular prothesis in RE.
722 Ocular prothesis in LE.
723 Guide dogs.

800 SUNWEAR DEVICES:
801 Plano sunglasses (Mfg. Transmission standard is 60%, 30%, 20%, & 10%).
802 Plano (sun or snow) goggles.
803 Plano sport devices (e.g., water skiing-watertight sun goggles).
804 Plano vocational devices (e.g.. welder's goggles).
805 Plano clip-on sunglasses.
806 Plano slip-in shades (front and/or sides).
807 Special plano sunwear devices (e.g., motorcyclist's helmet with wrap-around or flip-up filter).

1000 SEMI-PORTABLE, SEMI-STATIONARY MAGNIFIERS:
1001 Stand-type (desk, floor or wall) focusable magnifiers (e.g., gooseneck desk magnifier).
1002 Stand-type (desk, floor or wall) focusable magnifiers with illumination (e.g., Sloan focusable stand magnifier and illuminating handle).
1003 Stand-type (desk, floor or wall) non-focusable magnifiers.
1004 Stand-type (desk, floor or wall) non-focusable magnifiers with illumination.
1005 Stand-type (desk, floor or wall) Special magnifiers.

1100 SEMI-PORTABLE, SEMI-STATIONARY or STATIONARY BINOCULARS, MONOCULARS, TELESCOPES, etc.
1101 Stand-type binoculars.
1102 Stand-type binoculars with add.
1103 Stand-type binoculars with prescription (Rx) in eyepiece.
1104 Stand-type binoculars with zoom (mechanical or electrical).
1105 Stand-type special binoculars.
1106 Stand-type monoculars.
1107 Stand-type monoculars with add.
1108 Stand-type monoculars with prescription (Rx) in eyepiece.
1109 Stand-type special monoculars.
1110 Stand-type telescopes.
1111 Stand-type telescopes with add.
1112 Stand-type telescopes with prescription (Rx) in eyepiece.
1113 Stand-type telescopes with zoom (mechanical or electrical).
1114 Stand-type special telescopes.

1200 SEMI-PORTABLE, SEMI-STATIONARY or STATIONARY ELECTRO-OPTICAL & MECHANICAL-OPTICAL DEVICES:
(Electro-optical devices start at 3001-3099, Mechanical-optical devices start at 3051-3099).
1201 Closed circuit television systems with fixed focus lens (B/W camera).
1202 Closed circuit television systems with zoom lens (mechanical) (B/W camera).
1203 Special closed circuit television systems (e.g., with electronic window, etc.)
1251 Opaque Projectors.
1252 Overhead Projectors.
1253 Slide Projectors.
1254 Special Projectors (e.g., micro fiche).

1300 SEMI-PORTABLE, SEMI-STATIONARY NON-OPTICAL DEVICES:
1301 Stand-type (desk, floor, etc.) incandescent lamps, non-focusable.
1302 Stand-type (desk, floor, etc) incandescent lamps. focusable.
1303 Stand-type (desk, floor, etc.) incandescent lamps, hi-intensity.
1304 Stand-type (desk, floor,etc.) fluorescent lamps.
1305 Special stand-type (desk, floor, etc.) lamps.

REFERENCES

Bikson, T. K., T. H. Bikson, and S. M. Genensky, *Interactive Classroom Television Systems: Educational Impact on Partially Sighted Students*, The Rand Corporation, P-5933, February 1978.

Bikson, T. K., T. H. Bikson, and S. M. Genensky, *The Impact of Interactive Classroom Television Systems on the Educational Experiences of Severely Visually Impaired Students*, The Rand Corporation, R-2395-HEW (to be published).

Brewer, G. D., and J. S. Kakalik, *Handicapped Children: Strategies for Improving Services*, McGraw-Hill Book Company, Inc., New York, 1979.

Chronbach, L. J., "Coefficient Alpha and the Internal Structure of Tests," *Psychometrika*, Vol. 16, 1951, pp. 297-334.

Clewett, R. W., S. M. Genensky, and H. E. Petersen, *An X-Y Platform for RANDSIGHT-Type Instruments*, The Rand Corporation, R-831-HEW/RC, August 1971.

Genensky, S. M., *Some Comments on a Closed Circuit TV System for the Visually Handicapped*, The Rand Corporation, P-3984, December 1968. Also published in *The Optometric Weekly*, Vol. 60, No. 14, April 3, 1969; *American Journal of Optometry and Archives of American Academy of Optometry*, Vol. 46, No. 7, July 1969, pp. 519-524; and Hearings before the Subcommittee on Education of the Committee on Labor and Public Welfare, U.S. Senate, 91st Cong., 1st Sess., on S.1611 to amend Public Law 85-905 to provide for a National Center on Educational Media and Materials for the Handicapped and for Other Purposes, April 23, 1969, pp. 45-58.

Genensky, S. M., *Closed Circuit TV and the Education of the Partially Sighted*, The Rand Corporation, P-4343, March 1970. Also published in *Educational Technology*, Vol. 10, No. 8, August 1970, pp. 27-31.

Genensky, S. M., *A Functional Classification System of the Visually Impaired to Replace the Legal Definition of Blindness*, The Rand Corporation, RM-6246-RC, April 1970. Also published in *Annals of Ophthalmology*, Vol. 3, No. 2, February 1971, pp. 150-154, and *American Journal of Optometry and Archives of American Academy of Optometry*, Vol. 48, No. 8, August 1971, pp. 631-642.

Genensky, S. M., *Binoculars: A Long-Ignored Aid for the Partially Sighted*, The Rand Corporation, R-1402-HEW, November 1973. Also published in *American Journal of Optometry and Physiological Optics*, Vol. 51, No. 9, November 1974, pp. 648-670.

Genensky, S. M., *Acuity Measurements--Do They Indicate How Well a Partially Sighted Person Functions or Could Function?* The Rand Corporation, P-5587, January 1976. Also published in *American Journal of Optometry and Physiological Optics*, Vol. 53, No. 12, 1976, pp. 809-812.

Genensky, S. M., "Data Concerning the Partially Sighted and the Functionally Blind," *Journal of Visual Impairment and Blindness*, Vol. 72, No. 5, May 1978, pp. 177-180.

Genensky, S. M., et al., *A Closed Circuit TV System for the Visually Handicapped*, The Rand Corporation, RM-5672-RC, August 1968. Also published in *Research Bulletin of the American Foundation for the Blind*, No. 19, June 1969, pp. 191-204.

Genensky, S. M., et al., *Advances in Closed Circuit TV Systems for the Partially Sighted*, The Rand Corporation, R-1040-HEW/RC, April 1972.

Genensky, S. M., et al., *Interactive Classroom TV System for the Handicapped*, The Rand Corporation, R-1537-HEW, June 1974.

Genensky, S. M., et al., *A Double X-Y Platform for RANDSIGHT-Type Instruments*, The Rand Corporation, R-1614-HEW, December 1974.

Genensky, S. M., et al., *Information Transfer Problems of the Partially Sighted: Recent Results and Project Summary*, The Rand Corporation, R-1770-HEW, June 1975.

Genensky, S. M., et al., *A Second Generation Interactive Classroom Television System for the Partially Sighted*, The Rand Corporation, R-2138-HEW, June 1977. Also published in *Journal of Visual Impairment & Blindness*, February 1978, pp. 41-45, to appear in forthcoming issue of the *American Journal of Optometry and Physiological Optics*.

Genensky, S. M., H. L. Moshin, and H. E. Petersen, *Performance of Partially Sighted with RANDSIGHT I Equipped with an X-Y Platform*, The Rand Corporation, P-4943, January 1973. Also published in *American Journal of Optometry and Archives of American Academy of Optometry*, Vol. 50, No. 10, October 1973, pp. 782-800.

Genensky, S. M., H. L. Moshin, and H. Steingold, *A Closed Circuit TV System for the Visually Handicapped and Prospects for Future Research*, The Rand Corporation, P-4147, July 1969. Also published in *Annals of Ophthalmology*, Vol. 2, No. 3, June 1970, pp. 303-308.

Goodlaw, E. I., and S. M. Genensky, "Headborne Illuminator for the Partially Sighted," *American Journal of Optometry and Physiological Optics*, Vol. 55, No. 11, November 1978.

Kakalik, J. S., et al., *Services for Handicapped Youth: A Program Overview*, The Rand Corporation, R-1220-HEW, May 1973.

Kakalik, J. S., et al., *Improving Services to Handicapped Children*, The Rand Corporation, R-1420-HEW, May 1974.

Theil, H., *Principles of Econometrics*, John Wiley and Sons, New York, 1971.

U.S. Department of Health, Education, and Welfare, *Model Reporting Area for Blindness Statistics*, PHS/NINDP, Administered by NEI, 1962-1970.

BIBLIOGRAPHY

Adaptation of Jobs for the Disabled, International Labour Office, Geneva, 1973.

Aging and Blindness: Problems, Progress, Prospects, American Foundation for the Blind, N. Y., 1971.

Asenjo, J. A., *Rehabilitation Teaching for the Blind and Visually Impaired: The State of the Art, 1975,* American Foundation for the Blind, N. Y., 1975.

Barraga, N. C., "Learning Efficiency in Low Vision," *Journal of the American Optometric Association,* Vol. 40, No. 8, August 1969, pp. 807-810.

Barraga, N. C., "Utilization of Low Vision in Adults Who are Severely Visually Handicapped," *New Outlook for the Blind,* Vol. 70, No. 5, May 1976, pp. 177-181.

Barraga, N. C., et al., *Aids for Teaching Basic Concepts of Sensory Development,* American Printing House for the Blind, Kentucky Institutional Materials Reference Center, BBB09469, Louisville, 1973.

Bier, N., *Correction of Subnormal Vision,* 2nd ed., Appleton-Century-Crofts, N. Y., 1970.

Bikson, T. K., and J. B. Goodchilds, "Old and Alone," presented at American Psychological Association, 1978. Also published as P-6190, The Rand Corporation, 1978.

Blindness and Services to the Blind in the United States, OSTI Press, Cambridge, 1971.

Blindness and the Vintage Years, New Jersey State Commission for the Blind and Visually Impaired, Newark, 1972.

Boninger, W. B., "Aging and Blindness," *The New Outlook for the Blind,* Vol. 63, No. 6, June 1969, pp. 178-184.

Ciuffreda, K. J., "Juvenile Glaucoma--A Case Report," *American Journal of Optometry and Physiological Optics,* Vol. 52, No. 3, March 1975, pp. 230-232.

Clark, L. L. (ed), *Proceedings of the Research Conference on Geriatric Blindness and Severe Visual Impairment,* American Foundation for the Blind, N. Y., 1968.

Cohen, O., "Prejudice and the Blind," in I. F. Lukoff et al., *Attitudes Toward Blind Persons,* American Foundation for the Blind, N. Y., 1972.

Committee for Special Study of Severe Visual Impairment in Children of the International Association for Prevention of Blindness, "Causes of Severe Visual Impairment in Children and Their Prevention," *Documenta Ophthalmologica,* Vol. 39, No. 2, December 3, 1975, pp.213-341.

Courtney, G. R., and P. D. Watson, "Suggested Criteria for Vision Classification on the AAMD Adaptive Behavior Scale," *Journal of the American Optometric Association,* Vol. 47, No. 4, April 1976, pp. 469-474.

Cristarella, M. C., "Visual Functions of the Elderly," *American Journal of Occupational Therapy,* Vol. 31, No. 7, August 1977, pp. 432-440.

Cuendet, J. F., et al., "Association of Ocular and Otological Damage in an Institution for the Visually and Mentally Handicapped," *Journal de Genetique Humaine,* 24 Suppl., November 1976, pp. 215-220.

Delaney, A. M., and R. Nuthall, "Assessing the Needs of a Blind Client Population," *Journal of Visual Impairment and Blindness,* February 1978, pp. 46-54.

The Diabetic Retinopathy Study Research Group, "Preliminary Report on Effects of Photocoagulation Therapy," *American Journal of Ophthalmology,* Vol. 81, No. 4, April 1976, pp. 383-396.

The Diabetic Retinopathy Study Research Group, "Photocoagulation Treatment of Proliferative Diabetic Retinopathy," *Ophthalmology,* Vol. 85, No. 1, January 1978, pp. 82-106.

Dover, F. T., "Aging and Blindness: Special Needs," in *Proceedings of the Midwest Regional Conference on Services to Aging Blind Persons,* American Foundation for the Blind, N. Y., 1972.

Eggers, H., F. A. Jakobiec, and I. S. Jones, "Tumors of the Optic Nerve," *Documenta Ophthalmologica,* Vol. 41, No. 5, April 28, 1976, pp. 43-128.

Elliott, J. H., and D. J. Jackson, "Presumed Histoplasmic Maculopathy: Xeno Photocoagulation," *International Ophthalmology Clinics,* Vol. 15, No. 3, Fall 1975, pp. 197-205.

Ellis, R. S., *Summer Pre-placement Program for Severely Multi-handicapped Blind Children,* Office of Educational Evaluation, Evaluation Report BBB12238, N. Y., Summer 1975.

Estimated Statistics on Blindness and Visual Problems, National Society for the Prevention of Blindness, N. Y., 1966.

Faye, E. E., "The Role of Eye Pathology in a Low Vision Evaluation," *Journal of the American Optometric Association,* Vol. 47, No. 11, November 1976, pp. 1395-1401.

Faye, E. E., and C. Hood (eds.), *Low Vision,* Charles C. Thomas Publishers, Springfield, Ill., 1975.

Faye, E. E., et al., *Clinical Low Vision,* Little, Brown & Co., Boston, 1976.

Fonda, G., *Management of the Patient with Subnormal Vision,* 2nd ed., The C. V. Mosby Co., St. Louis, 1970.

Freedman, S., "The Assessment of Older Visually Impaired Adults by a Psychologist," *The New Outlook for the Blind,* Vol. 69, No. 8, October 1975, pp. 361-364.

Freedman, S., and D. E. Inkster, "The Impact of Blindness in the Aging Process," in L. G. Perlman (ed.), *Rehabilitation of the Older Blind Person*, Report of the Second Mary E. Switzer Memorial Seminar, National Rehabilitation Association, Washington, D. C., 1977, pp. 1-27.

Friedman, G. R., "Distance Low Vision Aids for Primary Level School Children," *New Outlook for the Blind*, Vol. 70, No. 9, November 1976, pp. 380-384.

Goldish, L. H., "The Severely Visually Impaired Population as a Market for Sensory Aids and Services: Part I," *The New Outlook for the Blind*, Vol. 66, No. 6, June 1972, pp. 183-190.

Goldish, L. H., and M. Marx, "The Visually Impaired as a Market for Sensory Aids and Services: Part Two--Aids and Services for Partially Sighted Persons," *New Outlook for the Blind*, Vol. 67, No. 7, September 1973, pp. 289-296.

Hanson, H. H., "Vision Screening of the Aged," *New Outlook for the Blind*, Vol. 65, No. 7, September 1971, pp. 213-215.

Harris, G. S., and J. Yeung, "Maculopathy of Sex-Linked Juvenile Retinoschisis," *Canadian Journal of Ophthalmology*, Vol. 11, No. 1, January 1976, pp. 1-10.

Hellinger, G. O., "Providing Ophthalmology and Optometric Diagnostic Examinations and Optical Aids for Legally Blind Aged Persons Under Medicare," *New Outlook for the Blind*, Vol. 65, No. 1, January 1971, pp. 18-20.

Herie, E. J., "Rehabilitation Services for the Blind and Visually Handicapped," *Canadian Journal of Ophthalmology*, Vol. 11, April 1976, pp. 30-34.

Hosni, F. A., "Survey of Major Blinding Conditions in Qatar," *Ophthalmologica,* Vol. 175, No. 4, 1977, pp. 215-221.

How to Integrate Aging Persons Who are Visually Handicapped into Community Senior Programs, American Foundation for the Blind, N. Y., 1974.

Inkster, D. E., "The Center for Independent Living in New York: A Residential Center for the Elderly Blind," *A Report on Independent Living for People with Severe Disabilities*, Center for Independent Living, Berkeley, Ca., 1976.

An Introduction to Development of Curriculum for Educable Mentally Retarded Visually Handicapped Adolescents, American Foundation for the Blind, N. Y., 1968.

An Introduction to Working with the Aging Person Who Is Visually Handicapped, American Foundation for the Blind, N. Y., 1972.

Jolicoeur, R. M., *Caring for the Visually Impaired Older Person. A Practical Guide for Long Term Care Facilities and Related Agencies*, Minneapolis Society for the Blind, Inc., Minnesota Governor's Citizens' Council on Aging, HRP-0014599/5SL, 1976.

Jose, R. T., "Getting Started in the Low Vision Field," *Optometric Weekly*, March 20, 1969, pp. 19-24.

Jose, R. T., "Low Vision Clinics: The Need, the Organization, the Manpower," in E. Faye and C. Hood (eds.), *Low Vision*, Charles C. Thomas Publishers, Springfield, Ill., 1975.

Jose, R. T., and G. Watson, "Hope for the Hopeless," *Optometric Weekly*, June 26, 1975, pp. 553-557.

Josephson, E., "Introduction," in L. L. Clark (ed.), *Proceedings of the Research Conference on Geriatric Blindness and Severe Visual Impairment*, American Foundation for the Blind, N. Y., 1968.

Kahn, H. A., et al., "The Framingham Eye Study," *American Journal of Epidemiology*, Vol. 106, No. 1, 1977, pp. 33-41.

Keegan, D. L., "Adaptation to Visual Handicap: Short-Term Group Approach," *Psychosomatics*, Vol. 15, No. 2, 1974, pp. 76-78.

Kent, S., "Is Diabetes a Form of Accelerated Aging?" *Geriatrics*, November 1976, pp. 140-151.

Kini, M. M., et al., "Prevalence of Senile Cataract, Diabetic Retinopathy, Senile Macular Degeneration, and Open-Angle Glaucoma in the Framingham Eye Study," *American Journal of Ophthalmology*, Vol. 85, No. 1, January 1978, pp. 28-34.

Kitazawa, Y., et al., "Untreated Ocular Hypertension," *Archives of Ophthalmology*, Vol. 95, No. 7, July 1977, pp. 1180-1184.

Kolk, C. J., "Demographic, Etiological, and Functional Variables Related to Intelligence in the Visually Impaired," *Journal of Clinical Psychology*, Vol. 33, No. 3, July 1977, pp. 782-783.

Krieglstein, G. K., "Pilocarpine-Ocusert-P-40 in the Handicapped Glaucoma Patient," *Klinische Monatsbl Augenheilkd*, Vol. 167, No. 1, July 1975, pp. 55-61.

Kuechenmeister, C. A., et al., "Eye Tracking in Relation to Age, Sex, and Illness," *Archives of General Psychiatry*, Vol. 34, No. 5, May 1977, pp. 578-579.

Lahti, A., "Rehabilitation of Patients with Visual Impairment," *Deudecim*, Vol. 91, No. 2, 1975, pp. 104-109.

Lavieri, M., and G. B. Wilson, "A Portable Closed Circuit Television Aid for the Partially Sighted," *American Journal of Optometry and Archives of the American Academy of Optometry*, Vol. 49, No. 2, February 1972, pp. 178-179.

Lewis, M. J., *Libraries for the Handicapped*, Library Association, London, 1969.

Lindstedt, E., "Partially Sighted Swedish Schoolchildren," *Documenta Ophthalmologica*, Vol. 39, December 30, 1975, pp. 351-364.

Lossner, A., and C. Matzen, "Correlation Between Visual Acuity and Ophthalmoscopic Findings in Presenile and Senile Macular Degeneration," *ZFA* (Dresden), Vol. 32, No. 2, 1977, pp. 51-58.

Lowenfield, B., "The Social Import of Blindness Upon the Individual," *Optometric Weekly*, June 5, 1969, pp. 50-56.

Lukoff, I. F., "Attitudes Toward the Blind," in I. F. Lukoff et al., *Attitudes Toward Blind Persons*, American Foundation for the Blind, N. Y., 1972.

Margach, C. B., "Low Vision Care in Practice--Some Current Perspectives," *Optical Journal and Review of Optometry*, Vol. 112, No. 11, June 1, 1975, pp. 12-17.

Margach, C. B., "Low Vision Aids--When 20/20 Is Not Enough," *Optical Journal and Review of Optometry*, Vol. 112, No. 13, July 1, 1975, pp. 20-34.

Margach, C. B., "Establishing a Low Vision Clinic, Part I," *Optical Journal and Review of Optometry*, Vol. 113, No. 4, April 15, 1976, pp. 62-64.

Margach, C. B., "Establishing a Low Vision Clinic, Part II," *Optical Journal and Review of Optometry*, Vol. 113, No. 5, May 15, 1976, pp. 58-60.

McGuire, M. A., *Early Rehabilitation Services for the Blind*, The Jewish Guild for the Blind, N. Y., 1966.

Mehr, E., and A. Fried, *Low Vision Care*, The Professional Press, Chicago, 1975.

Mehr, E. B., A. B. Frost, and L. E. Apple, "Experience with Closed Circuit Television in the Blind Rehabilitation Program of the Veterans Administration," *American Journal of Optometry and Archives of American Academy of Optometry,* Vol. 50, No. 6, June 1973, pp. 458-469.

Mehr, H. M., E. B. Mehr, and C. Ault, "Psychological Aspects of Low Vision Rehabilitation," *American Journal of Optometry and Physiological Optics,* Vol. 47, No. 8, August 1970, pp. 605-612.

Merte, H. J., "Rehabilitation of Visually Handicapped Persons," *Klinische Monatsbl Augenheilkd,* Vol. 166, No. 2, February 1975, pp. 151-156.

Minkoff, H., "Integrating the Aging Visually Handicapped into Community Groups in New York City," *The New Outlook for the Blind,* Vol. 69, No. 9, November 1975, pp. 396-398.

Monocular Visual Acuity of Persons 4-74 Years: United States--1971-1972. Vital and Health Statistics, National Center for Health Statistics, U.S. Department of Health, Education, and Welfare, March 1977.

Newman, J. D., "Rehabilitation: The Goal of the Low Vision Examination," *Optometric Weekly,* October 4, 1973, pp. 971-974.

Osher, M. S., "Intraocular Lenses: Visual Results and Complications. A Comparative Study," *Ophthalmic Surgery,* Vol. 7, No. 2, Winter 1976, pp. 71-78.

Otto, J., and D. Safra, "Visual Training of Partial Blinds Due to Organic Lesions," *Klinische Monatsbl Augenheilkd,* Vol. 166, No. 4, April 1975, pp. 458-478.

Pearlman, J. T., R. N. Axelrod, and A. Tom, "Frequency of Central Visual Impairment in Retinitis Pigmentosa" (Letter), *Archives of Ophthalmology,* Vol. 95, No. 5, May 1977, p. 894.

Perlman, L. G. (ed.), *Rehabilitation of the Older Blind Person,* Report of the Second Mary E. Switzer Memorial Seminar, National Rehabilitation Association, Washington, D. C., 1977.

Potts, A. M., D. Volk, and S. W. West, "A Television Reader," *American Journal of Ophthalmology,* Vol. 47, No. 4, April 1959.

Proceedings: Conference on Services to Aged Blind Persons (Williamsburg, Va., March 2-3, 1972), American Foundation for the Blind, N. Y., 1972.

Rehabilitation Teaching for the Blind and Visually Impaired: The State of the Art, American Foundation for the Blind, N. Y., 1975.

Rosenberg, R., "Training in a Low Vision Practice," *Journal of the American Optometric Association,* Vol. 39, No. 1, January 1968, pp. 57-60.

Rosenblum, A. A., "The Controlled Pupil Contact Lens in Low Vision Problems," *Journal of the American Optometric Association*, Vol. 40, No. 8, August 1969, pp. 836-840.

Rusalem, H., "A Study of the Incidence of Blindness in Homes for the Aged and Nursing Homes," *The New Outlook for the Blind*, Vol. 63, No. 6, June 1969, pp. 168-174.

Russell, B., "Services for the Older Blind: The Benefits of Specialized and Integrated Services," in L. G. Perlman (ed.), *Rehabilitation of the Older Blind Person*, Report of the Second Mary E. Switzer Memorial Seminar, National Rehabilitation Association, Washington, D. C., 1977, pp. 50-71.

Sarks, S. H., "The Aging Eye," *The Medical Journal of Australia*, Vol. 2, October 1975, pp. 602-604.

Sarks, S. H., "Aging and Degeneration in the Macular Region: A Clinico-pathological Study," *British Journal of Ophthalmology*, Vol. 60, No. 5, May 1976, pp. 324-340.

Schon, D., "The Blindness System," *The New Outlook for the Blind*, Vol. 64, No. 6, June 1970, pp. 169-180.

Schon, D., *Blindness and Services to the Blind in the U.S.*, OSTI Press, Cambridge, 1971.

School Census: A Means for Identifying Handicapped Children, Wisconsin State Department of Public Instruction, Bureau for Handicapped Children, Madison, 1968.

Scott, R. A., *The Making of Blind Men: A Study of Adult Socialization*, Russell Sage Foundation, N. Y., 1969.

Senior Aids for Senior Readers: A Visual Aids Pamphlet for the Elderly, Houston Public Library, Houston, 1975.

Simmons, R., "Current Ophthalmological Attitudes Toward Rehabilitation of Patients with Loss of Vision," *New Outlook for the Blind*, Vol. 60, No. 10, December 1966, pp. 299-302.

Sommer, A., "Cataracts as an Epidemiologic Problem," *American Journal of Ophthalmology*, Vol. 83, No. 3, March 1977, pp. 334-339.

Sprague, W. T., "Low Vision: Its Impact on an Agency," *Journal of Visual Impairment and Blindness*, Vol. 71, No. 5, May 1977, pp. 197-202.

State of Illinois Services for the Blind and Visually Impaired, State of Illinois, Office of the Superintendent of Public Instruction, Springfield, Ill. (no date).

Stern, M. F., "Activity or Idleness: Restoration of Social Contacts Among the Elderly Blind," *The New Outlook for the Blind,* Vol. 63, No. 6, June 1969, pp. 185-189.

Stern, M. F., "The Aging Blind and Lesiure Time Activities," *The New Outlook for the Blind,* Vol. 64, No. 2, February 1970, pp. 46-50.

A Study of the Visually Impaired Young People of Kansas and a Review of Educational Services, Kansas State Department of Education, Topeka, July 1974.

Taylor, D., "The Prevalence of Visual Handicap in Children in England and Wales," *Child Care Health Development,* Vol. 1, No. 5, September-October 1975, pp. 291-297.

Tisdall, W. J., et al., *Divergent Thinking in Blind Children,* University of Kentucky, College of Education, Lexington, November 1967.

Trouern-Trend, K., *Blindness in the United States,* The Travelers Research Center, Inc., Report No. 7635-316, Hartford, November 1968.

Tso, M. O., and F. G. LaPiana, "Human Fovea After Sungazing," *Transactions of the American Academy of Ophthalmology and Otolaryngology,* Vol. 79, No. 6, November-December 1975, pp. 788-795.

Vincent, J. P., et al., "A Case of Regression of Diabetic Retinitis in a Patient Affected by Carotid Stenosis," *Bulletin des Societies d'Ophthalmologie de France,* Vol. 76, No. 4, April 1976, pp. 17-21.

Watson, G., and R. T. Jose, "A Training Sequence for the Low Vision Patient," *Journal of the American Optometric Association,* Vol. 47, No. 11, November 1976, pp. 1407-1415.

Weale, R. A., *The Aging Eye,* Harper & Rowe, N. Y., 1963.

Woo, G., "Use of Contact Lenses in Low Vision," *Optometric Weekly,* August 28, 1975, pp. 768-771.

HV5653 Genensky, S.M.; S.H. c.1
G286 Berry, T.H. Bikson, and
T.K. Bikson.
VISUAL ENVIRONMENTAL ADAPTATION PROB-
LEMS OF THE PARTIALLY SIGHTED...(1979)
Date Due

HV5653 c.1
G286

Genensky, S.M.; S.H. Berry,
T.H. Bikson, and T.K. Bikson.
VISUAL ENVIRONMENTAL ADAPTATION
PROBLEMS OF THE PARTIALLY
SIGHTED... (1979)

DATE | ISSUED TO

Reference Copy

AMERICAN FOUNDATION FOR THE BLIND
15 WEST 16th STREET
NEW YORK, N.Y. 10011